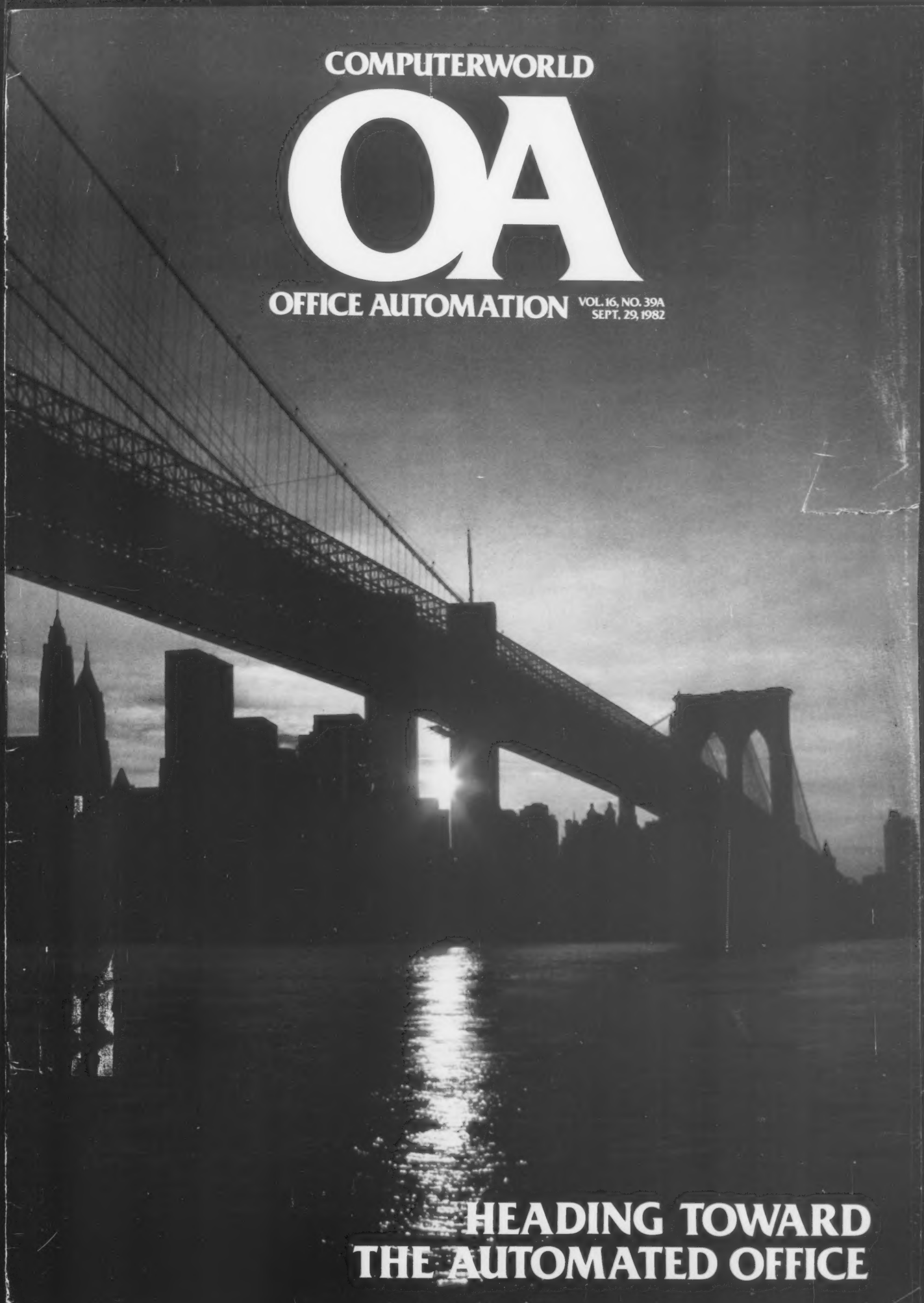
COMPUTERWORLD

OA

OFFICE AUTOMATION

VOL. 16, NO. 39A
SEPT. 29, 1982



HEADING TOWARD THE AUTOMATED OFFICE

NETWORKING

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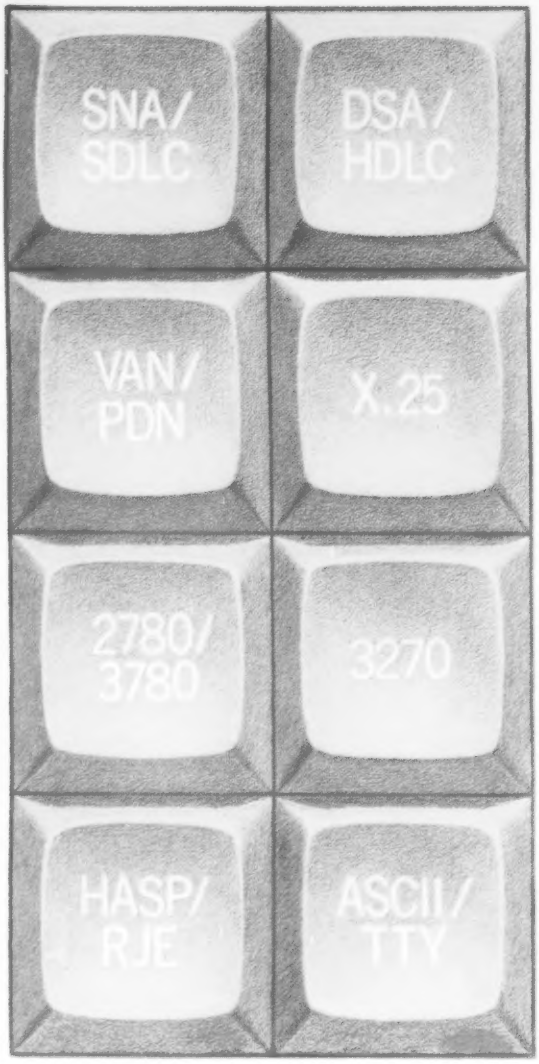

To Honeywell, Office Automation is better communication. People and information systems joined in a flexible network, exchanging information instantly, without confusion or delay.

Naturally, this means supporting many protocols: 2780/3780, SNA/SDLC, HASP/RJE, ASCII-TTY, 3270, X.25, DSA/HDLC, and others. Our office information systems can communicate with data bases maintained by multiple vendor host systems whether in-house or at remote locations.

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Honeywell Office Automation Systems
Three Newton Executive Park Drive
Newton Lower Falls, MA 02162 CW0929

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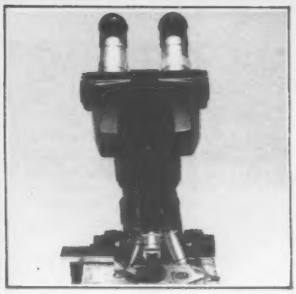

Office automation is on the horizon and just "about to happen." Organizations are beginning to build bridges that link users to automation just as the Brooklyn Bridge spans the East River and links Brooklyn and New York City.

COMPUTERWORLD

OA

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Hewlett-Packard on Office Systems

You don't have to buy separate syste processing. With the right solution, you

When you stop to think about it, all you really need from any business computer system is words, data, and graphics. And a way to make them available wherever they're needed. That's all there is to it.

At Hewlett-Packard, we think it's counterproductive to use completely separate systems just to get these simple, basic results.

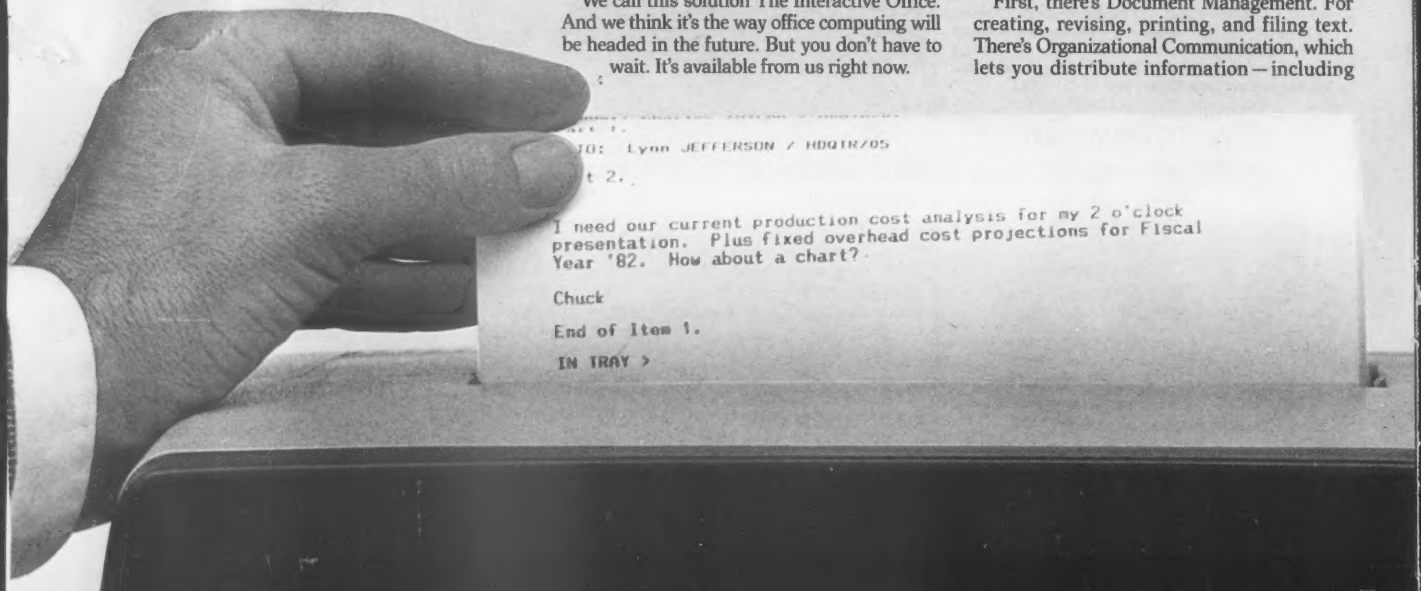
That's why we've developed a solution that puts the power of your data processing computer behind your office equipment. That makes every user's workstation a lot more versatile. And makes our data processing computer the driving force of a network that distributes on-line, interactive information all through your company.

We call this solution The Interactive Office. And we think it's the way office computing will be headed in the future. But you don't have to wait. It's available from us right now.

More power at every workstation. More versatility for every user.

Instead of designing The Interactive Office around a computer, we built it around the needs of the user. And organized it into four functional areas, each centered on the different jobs that come up in everyday business activity.

First, there's Document Management. For creating, revising, printing, and filing text. There's Organizational Communication, which lets you distribute information — including


TO: Lynn JEFFERSON / HDQTR/05
t 2.
I need our current production cost analysis for my 2 o'clock presentation. Plus fixed overhead cost projections for Fiscal Year '82. How about a chart?
Chuck
End of Item 1.
IN TRAY >

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Part 1.
TO: Lynn JEFFERSON / HDQTR/05
Part 2.

I need our current production cost analysis for my 2 o'clock presentation. Plus fixed overhead cost projections for Fiscal Year '82. How about a chart?

Chuck
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ms for office automation and data can do it all.

reports, memos, charts and graphs—the instant they're created. There's Decision Support, which makes it easy to get what you need to analyze, interpret, and present information. Finally, there's Personal Support, which helps you design a personalized approach to business computing.

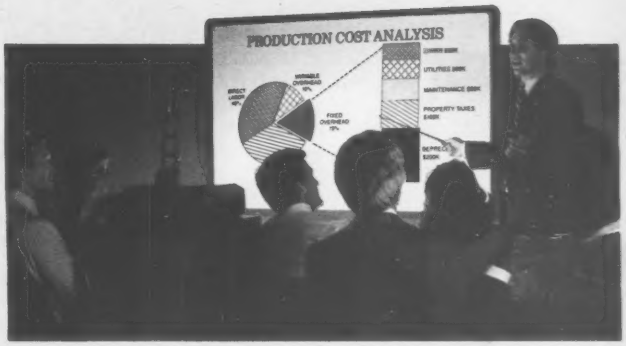
So it doesn't matter if you use the computer for word processing, electronic mail, to generate management reports, or to create charts and graphs. Or to do any combination of those things. In The Interactive Office, you can sit down at one workstation and do it all.

Just to give you one example, a secretary's main responsibility might be word processing. But your secretary can use the same word processing workstation to generate a management report for you, complete with charts and graphs, and then distribute your report electronically to branch offices all over the world.

And that's just the beginning. Because every one of our workstations can share the same valuable network resources: high-speed laser printers, data bases, communications links, and more.

More flexibility from your computer.

Our largest HP 3000 is powerful enough to process a large transaction like the company payroll, and support up to 100 Interactive Office users at the same time. But to give you even more flexibility, the first HP 3000 we ever built is software-compatible with our newer, faster models. Which makes it possible to upgrade to a bigger, more powerful model. Or combine several different models into a multi-node network. Without changing a single line of software.



And besides our powerful office automation functions, we have a full range of software tools for your EDP department. Starting with our IMAGE database, which has won worldwide recognition for its versatility and ease of use. Then there's our set of tools for programmer productivity, which help make them more efficient at designing, implementing, and maintaining new applications. To reduce the EDP backlog even more, we also have a range of off-the-shelf software solutions for manufacturing, distribution, and accounting.

Even the service and support are totally integrated.

Another good reason to do business with HP is our integrated service, which is available from more than 180 facilities all over the world. We'll assign a support team to help you plan your interactive office. They'll get to know your people—and your applications. And of course, they'll make regularly scheduled preventive maintenance checks.

All of this helps explain why we've maintained a leading position in customer service two years in a row, according to the 1981 and 1982 Datapro surveys, which involved thousands of computer users. And on the subject of reliability, we'll be glad to offer you our Guaranteed Uptime Service. Which states, in a nutshell, that if your HP 3000 system is up less than 99% of the time over a three-month period, your next month's service contract on all covered items is absolutely free.

So if you're looking at a lot of different computer systems for your office, we think you'd do well to see how your company could work if you tied it all together with one efficient, integrated solution.

If you'd like to find out more, stop by the local HP sales office closest to you. Or send for our brochure: The Interactive Office. Just write John Celii, Hewlett-Packard, Dept. 03142, 19447 Pruneridge Avenue, Cupertino, CA 95014.

HEWLETT PACKARD

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COMMENT

Persuading others to do what is good for them is never easy. Most people are unwilling to abandon old habits for new, untested and sometimes intimidating practices. This resistance to change is one of the major stumbling blocks inhibiting the widespread growth of office automation. Top executives, managers and department staff must all be convinced that office automation holds something beneficial for them personally or for their organization as a whole before they will be willing to make a move to automate. From past experience, users are wary of anything the management information systems department tries to introduce. Executives are cautious about spending money for largely undocumented paybacks. And everyone is concerned with being burned by an overeager vendor.

Selling people on the benefits of OA is not an easy task. And maybe that's because too often we attempt to fit the users to the system, rather than tailor the system and overall OA strategy to the needs of the users. This kind of selling takes more time and work, but it results in happier and more eager participants who are ready to progress into other areas of office automation.

A major obstacle to overcome before users are willing to buy OA is their lack of understanding of what OA means to an organization. They don't have to start out with a highly automated and sophisticated system. They can begin with a single technology and connect it to another, one step at a time and as organizational needs dictate.

In this issue we have highlighted some of the selling points for implementing OA in any organization. Suggestions that will "sell" the idea of OA or ease the transition of new technology into an organization are offered to you, the OA innovators. Articles you may find helpful include methods to justify system costs, guidelines to provide a smooth introduction for the staff, a way to bridge the DP gap by implementing an information center and keys to achieving productivity gains. In addition, we take a look at some methods to economize in this tight money period, surveying the area of videoconferencing and examining ways to tighten security. We also give you a look at optical disks, a technology on the OA horizon for applications with large data storage and fast access needs, and offer a comparison of professional workstations.

Some of these articles may spearhead your organization's start in OA. In the end, however, the best and most convincing reason to do so is that people's work will improve. You should get started before your competition does. The choice is yours.

TO OUR READERS

This marks the third issue of *Computerworld OA*, *Computerworld*'s quarterly publication that examines the developing OA marketplace. Current CW subscribers will continue to receive the publication as part of their subscriptions. Other readers who want to continue receiving *Computerworld OA* should subscribe to *Computerworld*, using the bound-in envelope and subscription form located in this issue.

ATTENTION READERS

We want to hear your comments. Please let us know your opinions, suggestions, problems and news regarding technological breakthroughs, equipment failures or office successes. Stories that appear in these pages are designed to meet your needs, so if they strike a chord of either agreement or disagreement, please let us know. Also, if a question about OA has been perplexing you, feel free to write to our Q&A section.

Q&A

What are the differences between baseband and broadband local-area networks? What options does each alternative offer in terms of cost vs. future technological impact?

As the name broadband implies, the basic difference between baseband and broadband local-area networks is bandwidth. Broadband networks, which are based on CATV technology, have the capacity to handle voice, video and other high data rate applications that baseband networks cannot. Further, like a cable television network, this bandwidth can be divided into many channels, each dedicated to a specific kind of equipment or application. Baseband networks provide only one channel, and all the equipment attached to the cable must contend for it.

The two primary contenders to date are Xerox Corp.'s baseband Ethernet and Wang Laboratories, Inc.'s broadband Wangnet. On the surface, the broadband scheme would seem to win hands down, but this is really a rather simplistic, albeit easy, technological argument to make. It is important not to get too tied up in looking at the network itself. The best way to approach the decision is to look at the equipment you want to hook up to it in the near and far term. If you do not foresee running interactive voice or video signals over network, and if the vendor — Xerox in this case — offers equipment that suits your needs, then the extra bandwidth offered by a broadband cable becomes a moot point. Compared with the cost of the terminals and other equipment on a network, either baseband or broadband, the cost of the network itself is relatively insignificant. There is no significant cost advantage in choosing either. In short, the choice should rest on current and anticipated applications and the data rates they will require.

We are forming a committee to survey and plan for our future office automation needs. No one seems to agree on who should be included. What is your advice?

The problems you are having with forming a committee to scope out your office automation needs reflect the basic difficulty with implementing office systems: The sheer breadth and diversity of the user community invites conflict.

Ideally, there are three elements that should be included if your committee is to have the proper perspective:

• First, it should have the technical wherewithal to evaluate the trade-offs for competing technologies.

• Second, it should have represented the business functions that will be the end users of the system. If end users, whether clerical, professional or managerial, are not included, specific applications needs will not be met. Further, giving these groups representation will give them a stake in seeing that the chosen system is a success.

• The third element is muscle, and this comes from the executive suite. Including influential top management in the process from the beginning will give the committee the clout it needs to see that its recommendations are carried out.

One of our vice-presidents recently read an article warning of the problems corporations can encounter if they have no policy on desktop computer acquisitions. He wants to know what our policy is.

I'm a staffer in the management information systems (MIS) department, and I have to come up with a policy. Can you help me?

There are several issues you should consider when forming your policy:

• Will the MIS department take an active role? Increasingly, the answer is yes. Many are setting up information centers offering selected brands as well as training and support.

• Will you recommend specific brands and/or operating systems? It's a good idea. For one thing, buying in quantity from a few manufacturers will get you quantity discounts. For another, compatibility is going to be enough of a problem without multiple operating systems. Your recommendations should take into account integration with existing word processing systems as well as a host or other computer system.

• Will the MIS department permit access to corporate files and data bases? You probably won't be able to say no, even if you think it best. The pressure from users may be too great. The best policy is to set training requirements and move with caution.

• Will the MIS department provide assistance with applications programming? Desktops are popular partly because most MIS staffs cannot keep up with applications demands they already have. If you have to provide assistance, keep it at the department level.

• Will MIS be responsible for network interfaces when users begin demanding increased connectivity for applications such as electronic mail? This can become a nightmare if you're not careful. Any plans of this kind should be taken into account from the very beginning, with the understanding that only a limited number of brands will be supported.

Readers are invited to send questions to* Computerworld OA, *Q&A Department, Box 880, Framingham, Mass. 01701.

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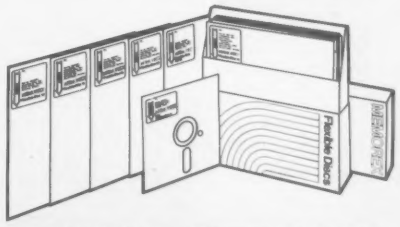

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NEWSBRIEFS

STAMFORD, CONN. — IN A MOVE TO STRENGTHEN ITS POSITION IN THE MARKET, XEROX CORP. HAS CREATED A NEW OFFICE SYSTEMS DIVISION (OSD) branching off from its Office Products Division (OPD). The new division will handle sales of Ethernet-based systems to end users and OPD will concentrate on making and selling stand-alone units.

The products offered by OSD include the Star 8010 professional workstation, the 860 word processor and the 820 personal computer, as well as a variety of interconnect equipment. The division will be located in Palo Alto, Calif., and headed by Donald J. Massaro, corporate vice-president and former OPD head. The old OPD will market the 820 and 860 along with facsimile equipment and other office products, but will not offer the Star. The Dallas-based OPD will be headed by William C. Jackson, former vice-president of OPD.

WELLESLEY, MASS. — IBM ACCOUNTED FOR HALF THE YEAR-END 1980 INSTALLED BASE, BUT SHIPPED LESS THAN ONE QUARTER OF ALL WORD PROCESSORS SOLD DURING 1981, according to a study by Venture Development Corp. The top five vendors — IBM, Xerox Corp., CPT Corp., Wang Laboratories, Inc. and Lanier Business Products, Inc. — shipped more than 70% of the WP installed base. IBM reportedly led in the stand-alone system area, controlling over half the market, with the next closest competitor garnering only a 6% share. Wang leads in shared-logic systems and as yet no vendor dominates in the more recently developed shared-resource system market. Venture is at 1 Washington St., Wellesley, Mass. 02181.

VALHALLA, N.Y. — SAVIN CORP. ANNOUNCED IT WOULD PHASE OUT THE MARKETING OF ITS WORD PROCESSING/DATA PROCESSING EQUIPMENT. The company said it planned to concentrate its resources in the copier field and that dropping its computer line would not have a material effect on the company.

For the nine months ended Jan. 31, 1982, Savin reported a loss of $10.5 million, compared with year-earlier earnings of $1.2 million. Revenue reportedly rose to $368.6 million from $318.5 million.

LOWELL, MASS. — WANG LABORATORIES, INC. AND CONTROL DATA CORP. (CDC) HAVE AGREED TO MARKET THE WANGWRITER THROUGH CDC'S NATIONWIDE NETWORK OF BUSINESS CENTERS. Sales of Wang's stand-alone word processor by CDC began immediately upon the announcement of the agreement. CDC's Business Center organization includes 55 business centers and 40 branch offices in 36 states and offers small business services usually only affordable to larger organizations, the company said.

IBM AND MITEL CORP. HAVE AGREED IN PRINCIPLE TO DEVELOP JOINTLY A NEW FAMILY OF IBM PRIVATE BRANCH EXCHANGE SYSTEMS. This marks IBM's full-fledged move into the U.S. telephone equipment business, which is currently dominated by its potential rival, AT&T. The joint agreement will enable IBM to move more quickly into an aggressive position in the marketplace. The agreement with the Ontario-based Mitel relates to "the development of a new IBM family of unique line switching systems" and that the efforts would mix Mitel's digital switching expertise with IBM's information processing strength.

BEAVERTON, ORE. — FIFTEEN COMPANIES, SPEARHEADED BY DIGITAL EQUIPMENT CORP., INTEL CORP. AND TEKTRONIX, INC., HAVE JOINED AN EFFORT TO ADOPT AND SUPPORT TWO EMERGING GRAPHICS STANDARDS. All of those participating plan to incorporate the standards into future products. The standards address methods for the creation and transmission of computer graphics images. Currently, no standard methods exist for these activities at lower interface levels, resulting in poor development and portability of graphics applications software.

STAMFORD, CONN. — THE TOP 100 U.S. COMPUTER COMPANIES GREW FOUR TIMES FASTER THAN THE ECONOMY AS A WHOLE LAST YEAR, according to a study by the Gartner Group, Inc.

In word processing, IBM led the field, as a result of its introduction of the Displaywriter. Other WP vendors among the top 100 are Wang Laboratories, Inc., Xerox Corp., CPT Corp. and Lanier Business Products, Inc.

WELLESLEY, MASS. — SHIPMENTS OF ALPHANUMERIC CRT TERMINALS WILL EXCEED THREE MILLION UNITS IN 1986, according to a report by Venture Development Corp. Venture predicts that the dumb terminal market will continue losing ground through 1986, and most vendors will upgrade their products and begin producing more smart terminals.

The report, "The Alphanumeric CRT Terminal Industry III: A Strategic Analysis," analyzes industry structure, the impact of graphics, emerging plug-compatible markets, foreign competition, vertical integration,

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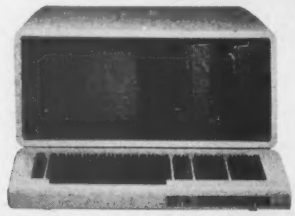

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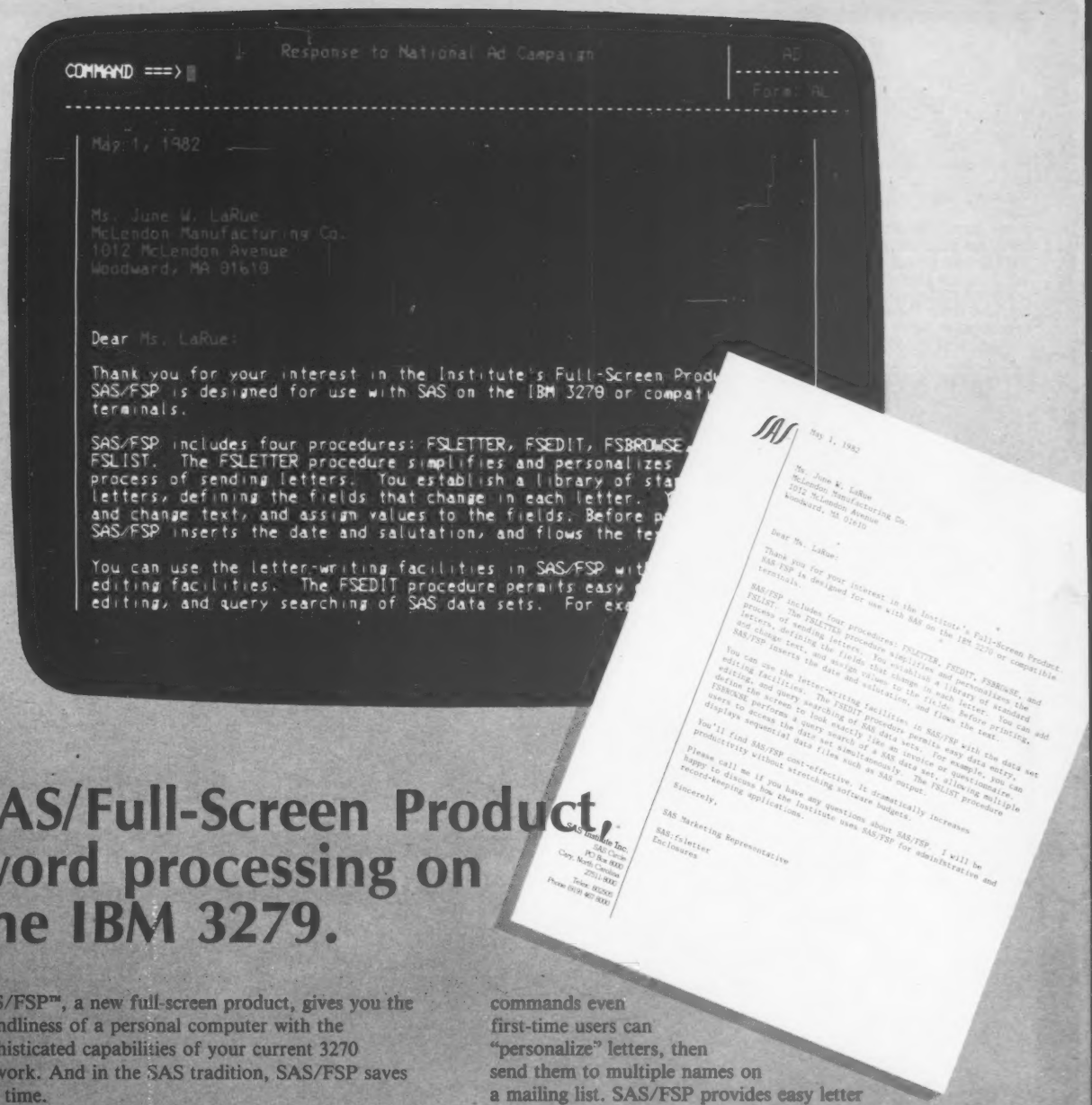
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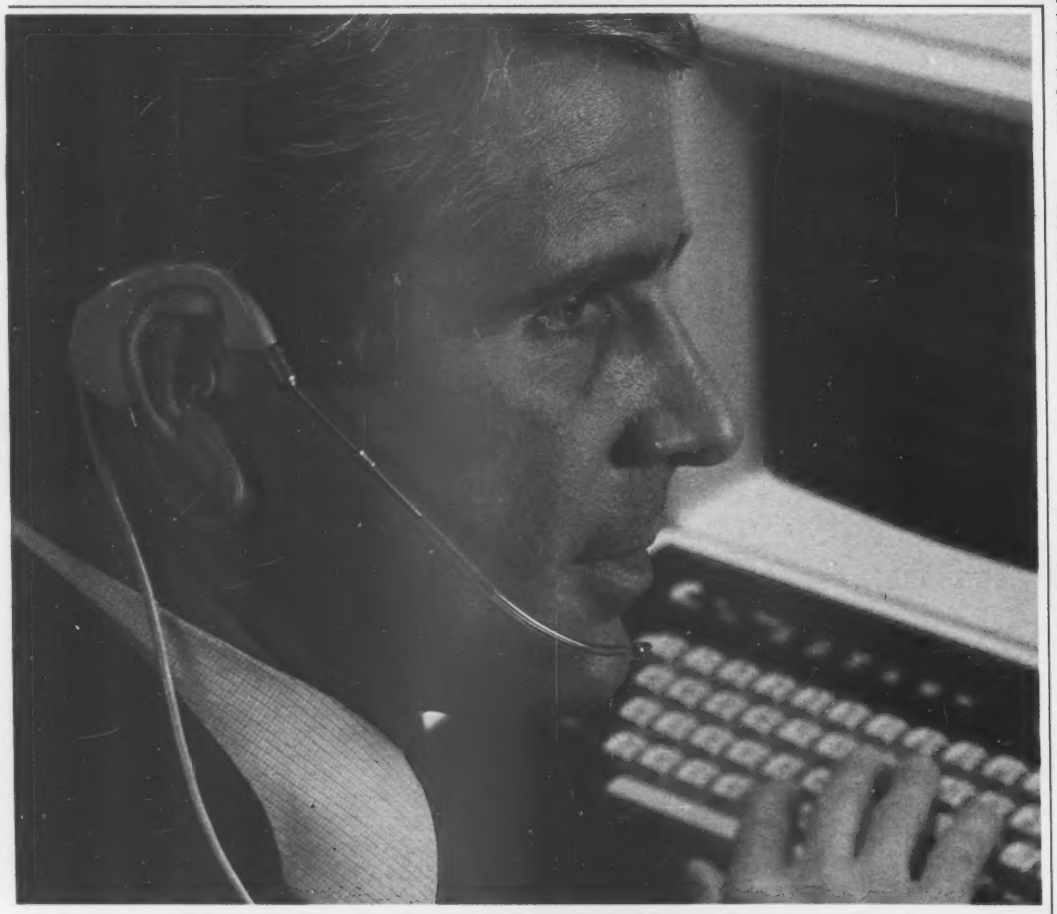
WILLOW GROVE, PA. — OFFICE SALARIES THIS YEAR AVERAGED GAINS OF 11% TO 13% FOR U.S. AND CANADIAN CLERICAL AND DP EMPLOYEES, according to Administrative Management Society's (AMS) annual salary survey. Twenty office positions — 13 clerical, three word processing and four data processing — were surveyed for data as of Jan. 15, 1982, encompassing 447,277 employees with 5,336 companies.

U.S. salaries rose 11.4% for the 16 office/clerical positions including the three word processing functions, averaging $244 a week, up from $219 in 1981. Lead word processing operators commanded one of the highest salaries of the clerical employees, with a weekly average of $282 in the U.S.

The weekly U.S. average for the four DP positions jumped 12.7% to average $311, ranging from $439 for programmer analysts, $367 for programmers, $288 for computer operators, to $226 for data entry operators.

In addition to national statistics and information on fringe benefits, the Office Salaries Directory includes further individual salary data; it is available for $90 from AMS, 2360 Maryland Road, Willow Grove, Pa. 19090.



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*Independent research conducted by H.B. Maynard and Company, Inc.

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MINNEAPOLIS — "PC PERSPECTIVES," A MONTHLY NEWSLETTER GEARED TO THE PROFESSIONAL USER OF THE IBM PERSONAL COMPUTER, WILL BE PUBLISHED STARTING SEPTEMBER 1982. The publication will cover products and applications of software and hardware in the office and factory environment. "PC Perspectives," published by Architecture Technology Corp., costs $195 for a year's subscription. Architecture Technology can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

NEW YORK — THE *WALL STREET JOURNAL* REPORTED THAT EXECUTIVES ARE TAKING FEWER OR CHEAPER BUSINESS TRIPS. Recession-ridden firms are urging managers to save money by using alternative methods of communication, such as electronic mail or teleconferencing. Westinghouse Electric Corp. cut meeting costs as much as 75% using teleconferencing methods.

LOS ANGELES — A TWO-YEAR STUDY TO EXAMINE THE EFFECTS OF THE PERSONAL COMPUTER ONSLAUGHT HAS BEEN LAUNCHED BY THE CENTER FOR FUTURES-RESEARCH. The University of Southern California's Graduate School of Business Administration's center will study both the internal workings of organizations and their relationships with clients being affected by the new personal computer boom.

The study will be completed in three phases. The first phase will be the technology and market forecasts, and the second will consist of assessing the potential impacts of technological and market developments and examining alternative futures made possible by the technology. The final phase will be concerned with formulating strategic options for the best use of personal computers.

Organizations that want to participate may write to Jack Nilles at the Center for Futures Research, USC Graduate School of Business Administration, Los Angeles, Calif. 90007.

WELLESLEY, MASS. — THE SHIPMENT GROWTH RATE OF SMALL BUSINESS COMPUTERS HAS SLOWED, ALTHOUGH THEY STILL CONTINUE TO BE THE FASTEST GROWING PRODUCTS IN THE COMPUTER INDUSTRY, according to a report by Venture Development Corp. Annual worldwide shipments by U.S.-based vendors will increase from $3.50 billion in 1981 to $9.96 billion in 1986.

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Introducing Change

By Peter G.W. Keen

Many practitioners are surprised by the idea that computer systems development is a highly political process. Managers rarely are.

New technologies represent major changes to all aspects of the organization: the ways in which jobs are defined and carried out, reporting relationships, influence and formal and informal communications. Opinions may vary on whether the changes are desirable, how ambitious the project should be and how and by whom it should be managed. These differences sometimes reflect vested interests, but are more often legitimate expressions of honest concerns. Politics is too often seen by technical specialists as irrationality. They explain that their excellent work was made ineffective because of politics. Far from being an acceptable justification, this means they did not do their systems analysis correctly and ignored the important issues of managing the organizational change implied by technical change.

Increasingly, the key individuals involved in implementing innovative computer systems in office automation are not technical project leaders. They are change agents who can handle the diffuse and complex organizational problems just as well as the technical problems. Often, the senior manager must become involved in this problem; it is not enough to approve the project and then sit back and wait. Implementing a computer-based system requires the same man-

ILLUSTRATION BY MARTY RISKIN

agement skills and involvement as any other major project. Despite the growing knowledge among managers regarding computer applications, there still seems to be a lack of awareness among technical personnel of the importance of nontechnical issues. Too often, they ignore the organizational context and build systems that, while technically elegant, are organizationally unfeasible. Only later do the broader political and organizational issues surface — sometimes painfully.

Resistance to Change: From the viewpoint of technical designers, the most difficult organizational problem they face is resistance. Sometimes resistance is passive and involves only foot-dragging; occasionally it is active opposition, even sabotage.

Resistance is a label that implies bad behavior. It seems more useful to view resistance as a signal — a legitimate reaction that should be *encouraged* and then responded to openly.

The main causes of resistance to computer-based innovations are:

- Resistance to computer personnel.
- A feeling that this is not a good project, that the cost-benefit assumptions are invalid.
- A lack of felt need; things are satisfactory as they are and this innovation simply disturbs the situation.
- A fear of social uncertainty, which is sometimes mistaken for a fear of computers.

The effective change agent learns how to diagnose a situation and identify, encourage and resolve the resistance. Of course there are, on occasion, other, less reasonable causes for the behavior, which may reflect selfishness, political games and laziness. Resistance of this type constitutes counterimplementation and does not lend itself to resolution by facilitation and communication.

Resistance to Computer People: Effective change comes from within. The people in an organizational unit commit themselves to a goal; share resources, knowledge and authority; and adjust their procedures to accommodate the new system. Sometimes, outsiders initiate the process; a consulting group, for example, may suggest changes, but cannot impose them. If the outsiders attempt to do so, either the new system will not be accepted or it will survive only after fire fighting and continued management attention.

Most computer specialists are outsiders as far as the rest of the organization is concerned. They are "them," not "us." The problem is compounded when the computer group is physically and psychologically isolated from its clients and users; located in a remote data center from which people emerge only occasionally, and then only to cause trouble.

Managing Change: If outsiders try to impose change, resistance is both likely and sensible; technical intruders have to establish credibility. This may be based on personal, political or professional trust. In general, the most effective change agents work hard to build direct links with their potential and actual clients and users. They demonstrate that theirs is a service (helping) role, rather than a purely technical role. Change agents build a clear picture of the organization: people, politics and procedures. They find out what the business plan is and try to get a sense of the priorities and concerns of the users. Change agents can often establish credibility merely by showing that they understand and appreciate the users' perspectives.

Building Credibility: The simplest way to build credibility is to provide users with a service or product they can validate. The sequence for the outsider trying to gain entry is:

1. Learn about current organization and procedures; one cannot improve something one does not understand. The best way to learn about offices is to visit them, watch what people do and ask questions.

2. Find out what concerns the people in the organization, in terms of problems and opportunities. Which areas have unsolved problems? What services can be provided to help the organization?

3. Select a small but salient problem and solve it; the problem should be visible and one for which a solution can be delivered within a few months.

Effective management of change involves facilitation and personal contact. Some technical specialists have neither the inclination nor abilities for this. Facilitation cannot be faked. If a designer wants to build systems and not waste time on "irrelevant" aspects, then:

- Implementation will be unlikely or, at the very least, more difficult.
- Resistance can be expected.
- A change agent must still be found.

After credibility has been established, the implementation process changes. Resistance can be resolved, and the "us-vs.-them" becomes "we." Any joint contract for change, however, must be based on realistic, mutual expectations. If, for example, the goals for a project are unclear, the designers may operate on one set of assumptions and the users on another. Each group is genuinely interested in the success of the effort and will do its best to ensure success. Success, however, has never been defined. The design team may well complain about the resistance of the users, who delay badly needed specifications, while the users find the design team resisting their urgent requests for reports and inquiry facilities.

All in all, the initial actions of the designer or the manager sponsoring the project can strongly influence its outcome. The manager can help by insisting that the technical specialists learn about the organization and that the users, from the start, be included in all discussions.

Cost/Benefit Issues: Even if no formal cost/benefit analysis is made, designers operate on some assumptions of costs and payoffs. A common cause of resistance — and even intense political opposition — is that the designers' benefits are the users' costs.

Felt Need: Innovations in organizations seem to be driven by demand-pull rather than by technology-push. Innovations occur when people have a real felt need; they face a problem or opportunity and seek a suitable solution. Technical specialists, especially those isolated from the organization, rely on technology-push. They have a solution and go looking for an application for it.

Innovations rarely occur through technology-push, especially if the organization is reasonably content with the existing situation. The perceived costs of change may be seen as greater than the perceived benefits (especially when the costs are immediate and real and the benefits are long term and based on untestable promises). Only when the status quo is not satisfactory is there any receptiveness to new technologies.

For designers, it is often self-evident that electronic mail or advanced text-handling tools are of value. For managers and clerical workers, this may not be so; the new technology may be a solution to a nonproblem. Resistance, then, is really lack of interest; if the designers insist on trying to impose the unneeded innovation, the users really will resist, as perhaps they should.

Designers can take two distinct approaches in dealing with this type of resistance. They can look for felt needs and identify problems that users really care about (this is a passive approach that is especially useful in building initial credibility), or they may more actively try to establish a felt need. Demonstrations, clarification of benefits — user benefits — and identification of successful applications elsewhere can build the demand that pulls the new technology into the organization. Rather than trying to sell, the designer must make the user want to buy.

Social Uncertainty: Innovations are unpredictable. New technologies are frequently disruptive; they often do not work out as intended and sometimes do not work at all. From the viewpoint of users, especially at lower levels of the organization, innovative systems leave them with a feeling of uncertainty:

- What will happen to the formal and informal relationships they are accustomed to?
- Will their own knowledge become obsolete?
- Where do they fit into the new system?
- What is going on anyway?

It is too easy to label such reactions as fear of automation; it is far more a fear of social uncertainty. It is natural for workers to distrust those who bring change. This distrust can be alleviated only by ensuring, from the beginning, that users are meaningfully involved, rumors kicked out early, training provided — throughout the project and not simply tacked on at the end — and, of course, credibility built by the designers.

Counterimplementation: Thus far, this article has assumed that what appears to be politics and resistance generally reflects the legitimate concerns of those affected by a system. Sometimes, of course, the unreasonable behavior is indeed unreasonable.

Counterimplementation is co-

Resistance is a label that implies bad behavior. It seems more useful to view resistance as a signal — a legitimate reaction that should be encouraged and then responded to openly.

vert or overt action designed to prevent a project's success. It often involves political games that are easy to play if the designer is an ignorant outsider with no credibility and the project is a large, all-or-nothing Big-is-Beautiful venture with no clear goals.

The first rule for counterimplementation is: never resist openly.

1. Do nothing given the natural complexity and inertia of the organization, nothing will happen in most cases anyway. If the designer and sponsor fail to build a felt need or develop a climate for change, it is likely that, after a while, the intruders will go away.

2. Complicate the project. For example, the best way to eliminate an effort by the administrative services department to put in an integrated budgeting system is to respond. "Great idea, but let's do it right. This is an opportunity to look at the whole planning process. We can integrate the divisional-corporate link and provide a complete facility, from data collection through analysis." This approach increases the scope of the project and involves more people. If one does this well, disagreement can be guaranteed. By making the project big, one can also keep it vague.

3. If the first and second approaches fail to slow down the effort, one can play the Reputation Game. This is particularly suitable for upwardly mobile managers who know they will be transferred within a year to a new job. The Reputation Game involves getting credit as an innovator without being around to pick up the pieces when the Grand Idea fails.

Counterimplementation (indeed resistance in general), whether reasonable or unreasonable, overt or covert, is made less likely and less effective by the Management Game.

The Management Game: Our final section provides a simple checklist for implementation that resolves most of the problems identified above. The Management Game — or counter-counterimplementation — is based on three simple principles:

1. The first and longest step involves entry: building credibility, understanding the organization and developing a joint contract for change.

2. Resistance should be encouraged.

3. Systems must have definite operational goals, be simple in design and be well phased.

The first principle has already been discussed. If resistance is indeed a signal, designers cannot afford to overlook or ignore it. If the cost/benefit calculation is incomplete or inappropriate, they need to find this out. If counterimplementation is likely, it must be brought out into the open. If the proposed design is politically or otherwise unfeasible, continuing it would be foolish. For all these reasons, the designers must provide a mechanism and forum for resistance to be expressed — they must then be willing to change the design and reduce costs or add benefits.

A suitable mechanism is the use of pilot projects and prototypes, which provide concrete output and a focus for attention. By involving the users, the designers get immediate feedback, users get a forum for expression and the designers can use the pilot to get a full evaluation. Meetings must be held at a time and in a manner that users feel is appropriate, so that they will express their concerns openly. Counterimplementation is made more difficult if a genuine opportunity is provided for expressing resistance; the Management Game then makes it illegitimate to resist later.

The final principle of the Management Game is simple design. It is often easier to plunge ahead with the omnipurpose, omniscient, integrated, strategic telecommunications analysis and reporting system than to define:

- The goals for the venture.
- Design criteria.
- A clear design architecture.
- User and designer responsibilities.
- The first phase.
- Evaluation criteria.

Innovation will always be difficult. In many ways, the more innovative a system, the more the process should be political and the more people should be forced to take sides, negotiate, clarify goals, and challenge each other's ideas. If designers view politics as grubby and their own role as purely technical, they may create a self-perpetuating cycle. Their increasingly excellent technical products will be defeated by increasingly grubby politics. If they see themselves as implementors and change agents, their technical excellence will be met by acceptance, not resistance.

This article is excerpted from Electronic Office: Management and Technology, *copyright 1981, published by Auerbach Publishers, Inc., Pennsauken, N.J.* # OA

Keen is an associate professor of management science at the Sloan School of Management, MIT.

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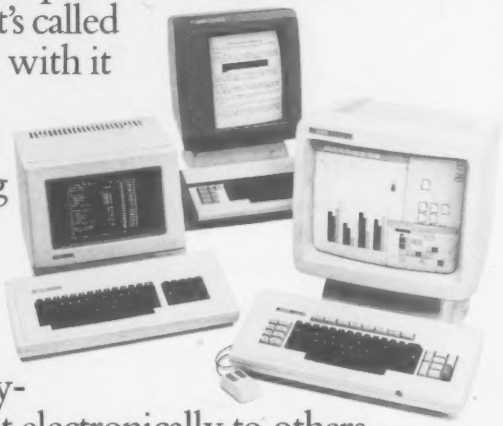

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By Amy D. Wohl

The Multivendor Environment

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No office automation vendor today offers a complete and perfect OA system suitable to every office environment. Some systems offer richly functioned office automation, but are poor at extensive, complex word processing tasks. Others, coming from a WP mind set, may be good at handling text but less agile at handling professional support activities. No system includes software for all the peculiarities of every application environment — if the system is good at scientific typing, it may not be great at legal documents and if it's superb with legal documents and time accounting, it may not handle form letters at all!

This creates some interesting problems for the user:

1. Compatibility between OA systems exists at only the crudest levels today — basically, an ability to transfer the contents of files with, at most, their print image preserved. Rarely can entire documents be transferred successfully and completely from one system to another with their editability preserved.

2. Given this difficulty in achieving system-to-system compatibility with multiple vendors, many users (particularly large firms with substantial desires to achieve information integration soon) opt for single-vendor

Some hostility to even benevolent dictatorships is likely, therefore even in companies with extensive information-sharing needs, it may not be politically viable to sell a single-vendor solution.

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environments to achieve maximum integratability.

3. In large companies, however, a sufficiently diverse community of needs exists so that it is unlikely any single vendor has a complete offering with all the features the entire company demands.

This leads to a Catch-22 situation with no optimal solution. And that's the problem. There is no simple, optimal, short-term solution to wanting the best of everything, all in one compatible environment.

Every business organization has a need for some degree of information integration. This need differs according to the relationships between the different business operations in which the firm is engaged. For instance, in a conglomerate made up of manufacturing companies with different products, different suppliers and different channels of distribution, there is very little need to aggregate information, beyond the need to collect financial data periodically.

In an insurance company or other information-based business, however, the need to think of all information as a kind of corporate resource (with an easy capability to access any required data) might be very high indeed.

Therefore, one would look at the office information processing needs of these two different environments quite differently:

- In the conglomerate, each business unit (location, division or group) could be permitted to make its own OA system selection, optimizing its system around its own unique requirements. Nevertheless, it would be wise to have some notion of the overall corporate plans for information aggregation and to provide some information sharing capabilities, such as a common set of communications standards, permitting the sharing of data content (if not of formats).
- In the insurance company or other information-intensive environment, the need to share information easily would take precedence over the need to optimize for individual environments. A manager or group within the company would determine the appropriate environment. Each group would then be bound to use this system in order to preserve the highest possible level of compatibility and information exchange.

Of course, we would want our benevolent dictator to select a vendor that offered a good variety of equipment configurations, features and price points so some selection and optimization would be available, although on a more limited basis.

Some hostility to even benevolent dictatorships is likely, therefore even in companies with extensive information-sharing needs, it may not be politically viable to sell a single-vendor solution. In this case, the OA manager has two choices:

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Beyond word processing and electronic mail facility TOSS™ offers office support facilities for professional staffs, managers and executives

System Features
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- Electronic mail facility.
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- Simple task facility.
- Accepting documents prepared from IBM Displaywriters or other word processors.
- Supporting 3270 CRTs, printers, TTYs and 3767 terminals.
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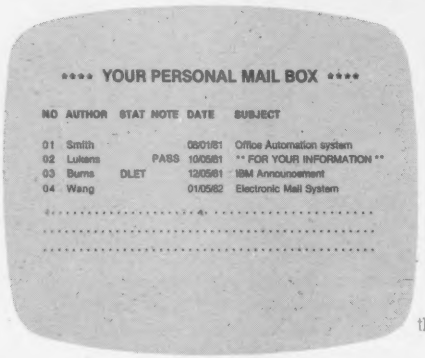
**** YOUR PERSONAL MAIL BOX ****
NO AUTHOR STAT NOTE DATE SUBJECT
01 Smith 08/01/81 Office Automation system
02 Lukens PASS 10/05/81 ** FOR YOUR INFORMATION **
03 Burns DLET 12/05/81 IBM Announcement
04 Wang 01/05/82 Electronic Mail System

System Benefits
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- System growth emanates from existing equipment, lower system cost.
- Ability to work with co-workers in different time zone, and to work outside office.
- System integrates word and data processing, together they produce more than they do separately.

System Availability

TOSS is available under MVS, VSI and DOS/VS with CICS support on IBM mainframes.
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1. Give up. Let each person order whatever he wants and can individually justify. Let everyone deal on an ad hoc basis with whatever chaos this engenders. Assume that in the long run, either no real office automation at the corporate level will occur (because of the lack of compatibility) or that everything will get thrown out and a new compatible system will be installed.

If you choose or are forced to choose this course, its implications should be put on the record for self-protection. (Also, you might like to retype your resume and have a few copies made or plan to retire next year!)

2. Try to bring some compromise about. Understand that any single-vendor/system solution is likely to be unpalatable, but try to settle for a compatible or semi-compatible small group of approved systems. Make the selection set sufficiently broad and sufficiently attractive that there will be no real reason for demanding a product not on the approved list. Try to get top management's commitment to "no exceptions" or a stiff waiver procedure (the division manager's signature in blood would be a good start!). Look for systems designed to coexist (IBM or IBM-compatible systems usually can work at some level of compatibility with a variety of systems, because IBM provides a sort of de facto standard).

If you are committed to a multivendor environment, here are some guidelines:

• Don't try to allow each person to have anything he wants. You can't design a compatible environment to include everything. Try for a compromise agreement on a relatively small number of systems.

• Don't permit exceptions to the rules without good reason. Always be certain the exception requestor understands the ground rules — the limits on what you will provide. These limits will probably relate to the availability of support in integrating or supporting a system (and if you don't establish limits here, you are giving out a loud and clear message that you don't really mean what you say). Put into writing the agreement on what will be provided (a formal procedure for signoffs helps here).

• Don't assume any two things can coexist in the same system. Demand — and get — a benchmark or test to be certain of exactly what will happen. This is particularly important when the material to be transferred from one system to another includes heavily formatted data or text; formats are the hardest things to transfer successfully in editable form.

• Understand the different levels of compatibility and teach your users what they mean:

Physical connection: You have a compatible plug and a receptacle it fits. When you plug it in, it won't blow up. Transferring meaningful data is not implied.

Data transfer: Data can be transmitted across the physical connection, but only the content of the data stream, not its format, will be transferred. In some cases, this data can only be viewed on the receiving screen; in other cases, it can actually be transferred to the storage of the receiving system and treated as data.

Print image: The system sends out the data with its physical format seemingly intact, but this is achieved by "filling in the blanks." No codes governing formats (to permit further editing) are transmitted.

Editable text: The system sends out data plus a "best efforts" attempt to convert the format information from the codes of

Don't try to allow each person to have anything he wants. You can't design a compatible environment to include everything. Try for a compromise agreement on a relatively small number of systems.

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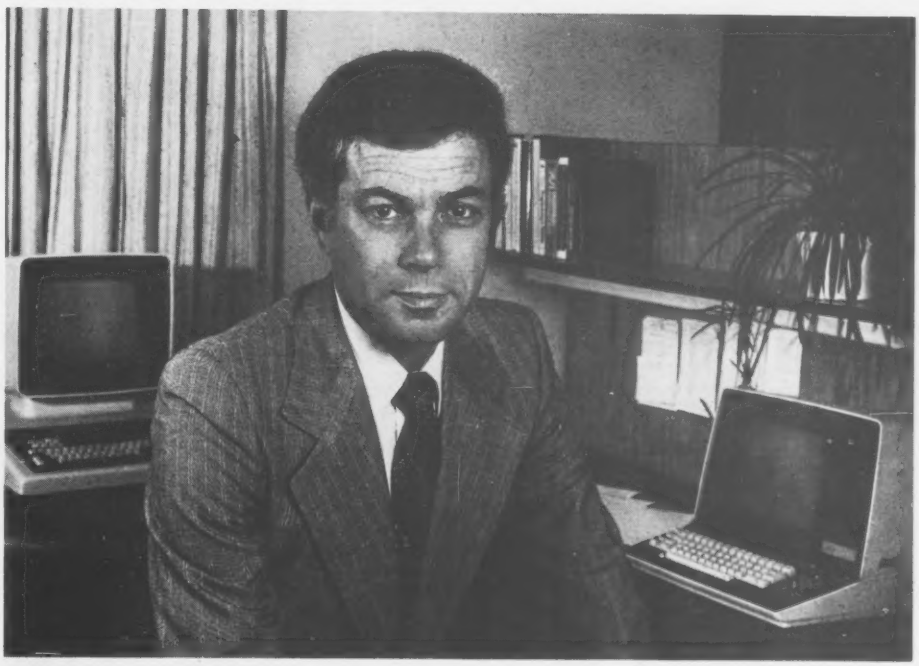

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the sending system to the codes of the receiving system. Some codes are lost on the way. (Most "compatible" word processors and "black boxes" work this way.)

Smooth and seamless: This is what we really want. The ability to transfer complete data and all format information. Really, the ability not to recognize or consciously deal with the intersystem compatibility problem at all.

These problems will not go away. Assuming adequate memory and appropriate software were available, it would be possible to write conversion programs connecting every OA system to every other OA system. However, there are economic and theoretical limits to what can and will happen:

Multivendor environments are neither good nor evil. They offer certain advantages in flexibility and individual user or group optimization.

• Vendors will write these interconnection utilities only where it pays them to do so: for conversion between the most popular systems. That will make it easy to connect IBM to nearly everything and Wang Laboratories, Inc. gear to most of everything (with up-and-coming popularity contest winners likely to include equipment from Digital Equipment Corp., Xerox Corp., a full handful of distributed data processing firms and an occasional WP vendor). It will be an expensive custom job to interconnect more obscure systems.

• A time penalty will be paid for the conversion process, making it fairly clumsy for some applications.

• There are limits to the conversion process. Basically, you can only convert what the receiving system provides for. Normally, any codes not relevant to the receiving system are tossed out; consequently, the likely result of several rounds of transmission between two systems with dissimilar capabilities will be that not much formatting will be preserved.

Do not despair at the lack of cheery news. Another possibility is that we will enact widely accepted standards, creating the environment in which information interchange can occur smoothly. A number of groups are currently lobbying for various kinds of standards, ranging from standard keyboards to wide-area and local-area network standards.

Keep in mind, however, that such standards are probably still a long way off. When they do occur, they are likely to be in a constant state of flux as vendors adapt their systems to the standard, offer new features and become nonstandard, readapt the standard to incorporate new features and so on. Standards will, in the long run, help us design and run multivendor environments, but we will have to recognize their limitations and, in any event, wait for OA standards to arrive.

Multivendor environments are neither good nor evil. They offer certain advantages in flexibility and individual user or group optimization. In return, they expect the user to accept procedural discipline (to get around discontinuities) and an acceptance of the limitations of information integration imposed by the varying degrees of compatibility that will be offered.

Individual user organizations should look strongly to their needs for information integration in the short and medium run and should try to match these needs to their willingness to accept a single-vendor environment or their desire to permit greater individual user autonomy. In the long run, greater equipment capability will lessen the need for multivendor environments just as, at the same time, it offers more possibilities for interconnection via more flexible hardware, more capable software and the introduction of OA standards.

A promising future lies tantalizingly just beyond our current reach. OA

Wohl is president of Advanced Office Concepts Corp., an office automation consulting firm based in Bala Cynwyd, Pa.

CPT explains what happens after you buy a word processor.

If you bought any of the new CPT8500™ models, two things will happen right away.

First, your CPT representative will arrange an installation date that's convenient for you. And second, he'll get your staff started *immediately* in CPT's personalized training program, so they will be ready when the equipment arrives.

Relax. CPT will take care of all the details of installing your new word processing system.

The big day

On the appointed day, after the installers depart, you're left with an impressive new system.

So you sit down at one of the workstations. And after a few hesitant moments, you're typing on CPT's unique video screen. Mistakes are corrected easily, right before your eyes. When your first document is letter-perfect, you print it out, via electronic printer, at 540 words a minute.

Best yet, you have a permanent record of what you've typed, stored on a "floppy" magnetic disk.

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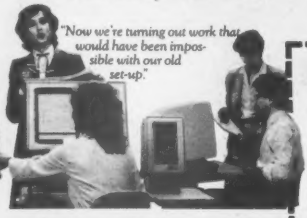
In the next few months, you'll be continuously amazed by how the new system speeds up work. How CPT's 10-key number pad on the keyboard makes it easy to handle figures. How the display screen's preview area lets you review your floppy disk files—even while another document is being typed. And how easy-to-use software programs can help you handle payroll, manage inventory—even do sales forecasting.

But believe it or not, you've just begun to tap into the potential of your new CPT word processors.



Your automated office

As your office grows to rely on word processing more, you may want to expand. And that's when you'll be glad you bought a CPT system.

The CPT 8500 series is actually four word processors in one. The entry-level CPT 8510 can easily be upgraded to the more powerful 8515 or 8520—even the top-of-the-line 8525.

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And when the time comes, CPT can even help you tie your word processing system into your larger array of office equipment.

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☐ Please send me your free booklet: CPT Shows You How To Get Into Word Processing—A Step At A Time.

☐ I'd like a CPT sales representative to call me.

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Address_____

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Phone (_____)_____

CPT takes the mystery out of word processing.

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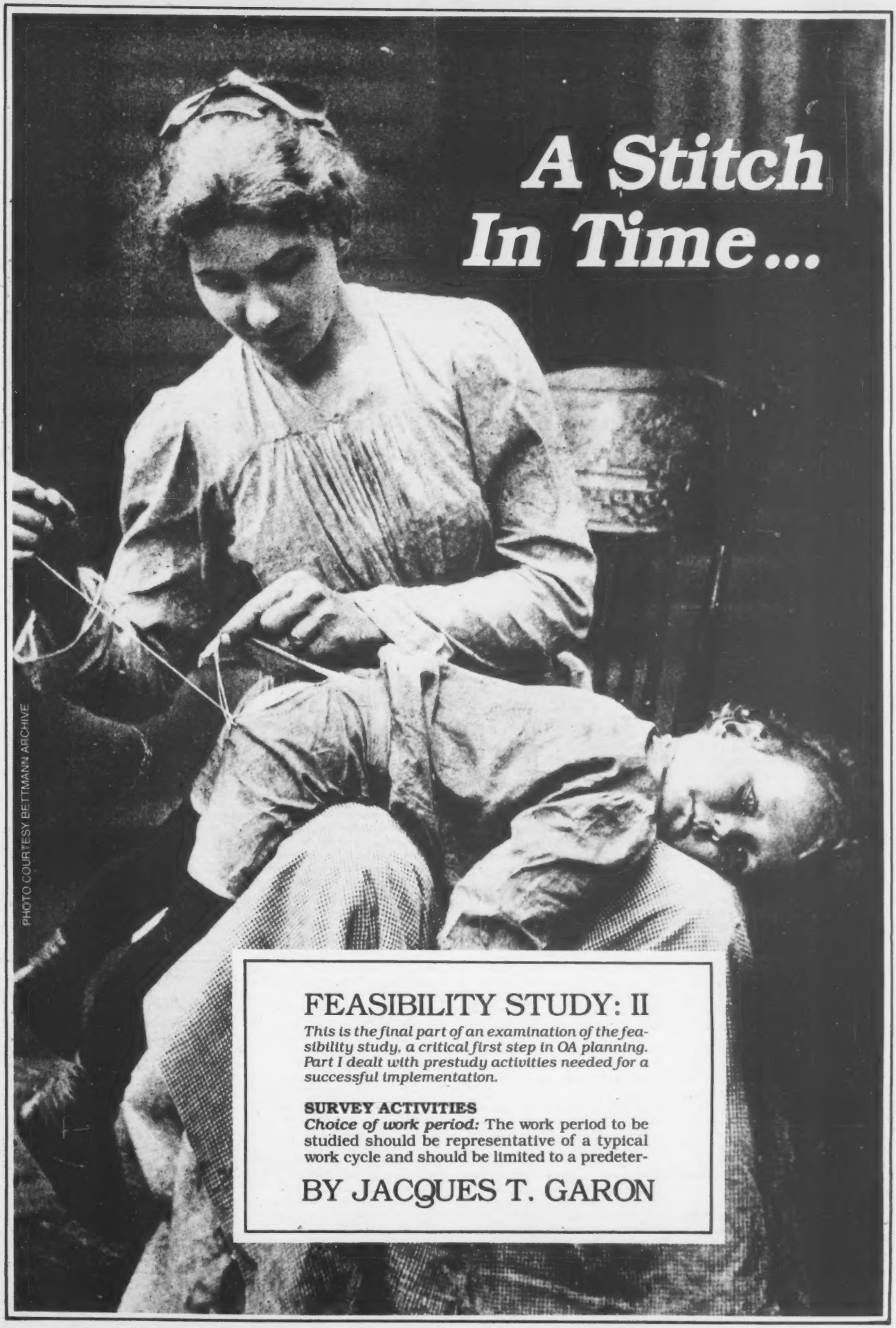

A Stitch In Time...

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FEASIBILITY STUDY: II

This is the final part of an examination of the feasibility study, a critical first step in OA planning. Part I dealt with prestudy activities needed for a successful implementation.

SURVEY ACTIVITIES

Choice of work period: The work period to be studied should be representative of a typical work cycle and should be limited to a predeter-

BY JACQUES T. GARON

mined time span (usually two weeks). If the survey period is not a normal one and the average work load cannot be determined, the survey should be extended to equalize the high and low production periods. If this is not feasible, data must be adjusted to reflect the abnormal period.

Data collection method: The data collection method includes a daily log and a work sampler. For a long time, industrial engineers have been using work sampling to obtain data on group activities. Because the repetitive steps of a particular task can be examined, it is possible to determine precisely how long a given task should take and to measure work productivity. As a result of the diversity of activities in the office, few organizations have attempted to establish work-sampling time standards. However, increasing costs have caused management to utilize these techniques once again in an attempt to control expenses.

In addition to the daily log and work sampler, a random observation of special conditions, special timely reports and so on should be included under data collection methods.

Data collection procedures: Data should be collected on the following:

- Typing work load.
- Time spent on administrative tasks.
- Annual typing work load projected by means of a review of historical information for volume and adjustment for any cyclic conditions.
- Location of principals in relation to administrative support (activity/space/layout/organizational chart).
- Word processing/administrative support tasks that can be consolidated (filing, correspondence/mail-system).
- Current office system equipment.

Fact gathering: Proceed with interviews, questionnaires to principals and administrative staff, estimates, random sampling and historical data. More specifically, methods for gathering facts include:

- Originators and administrative support staff questionnaires. Either prior to or during the survey, originators should complete a questionnaire that identifies the present and potential typing and nontyping needs as well as the degree of satisfaction with present work methods and improvement ideas.
- Administrative staff questionnaires. This information is considerably more analytical and relates to actual typing and other administrative functions such as author revisions, the number of carbon copies and correction techniques. This questionnaire should determine the use of a copier in the work process.
- Job analysis of the administrative staff's work day. A job analysis form filled out by the administrative support staff should contain four sections.

The first identifies the principal supported — the person for whom work is performed. The second should contain a detailed listing of the activities and time the staff spends on jobs during a normal working day. It should also specify types of input, document length and type of documents. For activities that are not routine, the staff is asked to complete the third section listing the principal for whom the work is done, the nonroutine projects and work assignments, frequency and time involved. The fourth and final section is reserved for a description in narrative form of the nature of the job and the work flow routine, pinpointing problem areas and suggestions for improvements.

Although the job analysis provides substantial information on staff work load, it is not sufficient by itself; the time reported is estimated and is unlikely to be totally unbiased. Therefore, it is necessary to do a work sampling survey to obtain statistically accurate and objective data.

- Interviews. Interviews are excellent tools for gaining insight into attitudes of personnel involved in the study group and verifying information previously gathered. Department managers should be interviewed to determine departmental functions and administrative priorities and problems.

From this information, relationships between departments can be identified and used to establish the need for different equipment in the total office system. Those people contributing supervisory time should be interviewed to gain information relating to maintaining work statistics, regulating work flow, quality standards and so on.

Analysis: The survey techniques discussed will produce a vast amount of statistical data, which must be organized, analyzed and classified. Because the prime concern of the study is the effectiveness of the support function, the data is examined first on an individual basis. The work sampling survey will yield actual time studies that indicate how each person utilizes time in a given work day. The percentage of time should be shown, together with the hours per week spent on a particular activity.

This data is analyzed to establish the administrative support and typing needs of that clerical position. It is then extended to the department as a whole and, eventually, if such data is available, to the entire firm. A time distribution chart should graphically portray both the actual productive and nonproductive time, which clearly indicates the true cost of support services.

Study results: These will give work load profile, alternatives for providing administrative support services, alternative equipment selections and productivity improvement results (such as cost savings between the present and alternative methods for providing services), potential for increased typing production, opportunity for reduced man-hours and potential for redirecting man power to other priority functions.

Recommendations: Having completed its study and analyzed the information gathered, the study team must now present its report to management, work originators and support staff. The report should be made both orally and in writing.

Before suggesting specific changes, the study team must be able to document the case for improved management, projected future expansion of present work load, decreased labor costs and personnel requirements and improved efficiency. The team can best do this by asking the following questions for each of the reecommendations: What is prescribed? Why is it important? Who should do it? What are the benefits? How can it be accomplished? What resources are required?

When changes or additions to existing equipment are recommended, the study results must clearly explain how the equipment was evaluated and why it was determined to be the best or only kind of equipment to do the job. To be able to offer such an explanation, the study team must contact suppliers and request information about systems features, usage, training, support capabilities, maintenance and repair service and new product development.

The team should provide a full description of alternative specific equipment, including its configuration, features and compatibility; approximate costs; and delivery schedules. They should also provide details of rent/lease-vs.-buy arguments.

Finally, management support selection; management support training; job description and career development; personnel selection, orientation and training; and site preparation must also be covered.

BAD BUYING PRACTICES

1. Buying backwards. Absurd as it may seem, many have bought systems even before considering exactly what they will be doing.

2. Inadequate contracts. Otherwise sensible businessmen often commit themselves to an agreement involving several thousands of dollars without any contract at all or without including the right terms.

3. Failing to test-drive the equipment. Buying equipment without actually running some software on it is like purchasing a new car without ever driving it. Be careful of demonstration programs that may not test the features or performance in a way applicable to your needs.

4. Buying blind. Unless you have determined your needs, you are likely to be buying blind. Detailed specs are a must.

5. Passing the buck. The right person to make an equipment decision is often someone at the top who has an overall view of the organization's needs. If you give the job to a low-level manager, only that department's needs may be satisfied.

6. Unrealistic expectations. Buying equipment can accomplish important goals, but it won't save a failing business, make a decision for you, allow immediate staff reductions or help make sense of things.

7. Ignoring hidden costs. Master computer equipment needs a lot of auxiliary equipment and supplies. Take into consideration all the little extras, including all hardware items and software packages. Don't overlook special costs such as installation, preparations, personnel and insurance.

8. Buying from the wrong supplier. Don't forget that vendors are salesmen — they're not entirely on your side. Evaluate the vendor as carefully as the system. Ask for references.

9. Buying a dead-end machine. Don't buy a system with no room for later expansion. DP needs often grow faster than other parts of the business. If the computer cannot keep up with that growth, it will have to be replaced sooner than expected.

10. Buying for the wrong reasons. Just because your biggest competitor gets a complete office system, it doesn't mean you have to have one, too. Office systems help you to make more money if they can reduce operating costs or allow expansion; otherwise, you probably don't need the system.

SURVEY ACTIVITIES TIMETABLE

Interview: *1½ hours.*

Do daily data summary: *1½ hours daily.*

Do daily recordkeeping/filing: *1½ hours daily.*

Provide feedback, verify: *As necessary.*

Analyze results: *1 to 2 weeks.*

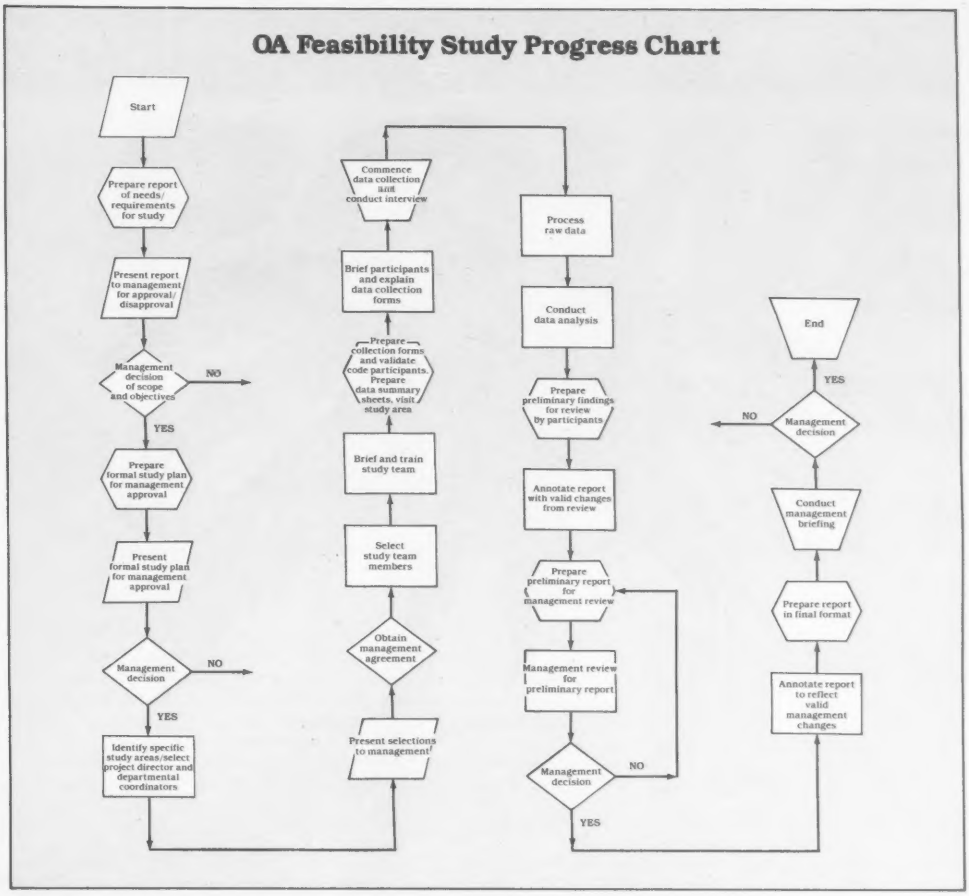
Do system design with alternatives: *1 week.*

Present findings and recommendations to each department head: *1 to 3 days.*

Present report/proposal to top management: *1 day.*

IMPLEMENTATION ACTIVITIES

Briefings: Briefings can be accomplished by means of a staff


OA Feasibility Study Progress Chart
Start
Prepare report of needs/ requirements for study
Present report to management for approval/ disapproval
Management decision of scope and objectives
NO
YES
Prepare formal study plan for management approval
Present formal study plan for management approval
Management decision
NO
YES
Identify specific study areas/select project director and departmental coordinators
Commence data collection and conduct interview
Brief participants and explain data collection forms
Prepare collection forms and validate code participants. Prepare data summary sheets, visit study area
Brief and train study team
Select study team members
Obtain management agreement
Present selections to management
Process raw data
Conduct data analysis
Prepare preliminary findings for review by participants
Annotate report with valid changes from review
Prepare preliminary report for management review
Management review for preliminary report
Management decision
NO
YES
End
YES
NO
Management decision
Conduct management briefing
Prepare report in final format
Annotate report to reflect valid management changes

meeting or a letter from the president or department head. Whatever the medium, the message should thank personnel for their cooperation, cite the system's numerous advantages and request the staff's continual cooperation. In addition, it should note that meetings will be scheduled as appropriate to discuss the program and opportunities available to personnel.

Ordering and choice of equipment: Select the three leading vendors suggested by the study's conclusion and demand specific demonstrations. Let the vendor go through with his canned demonstration, but make sure your personnel actually try some of the functions. Is the equipment as easy to operate as it looks and sounds or is it complicated? Go through each vendor's offerings with the same people and the same work samples. Consider the equipment chosen for your particular geographical location. Can you find backup support services — temporary personnel, additional training programs and so on?

Site preparation: Preparation of the site is a most crucial step. Many systems have failed to function properly because of inadequate planning of paper flow and space and a lack of prior study of the site itself. Get answers to the following questions:

- Do we need extra electrical outlets and dedicated lines?
- Do we need tile or carpeted floors? If carpet is your choice, buy the static-free carpeting already on the market.
- Does the location of each piece of equipment allow an effective flow of air, paper and personnel?
- Do we need special furniture?
- Do we need acoustical enclosures for printers? Should we insulate walls and the ceiling with absorbing sound materials?
- Do we need a separate air conditioner or humidifier?
- Do we have enough telephones?
- Do we need to order extra supplies?

Training schedules and tools: The most successful training programs devote a smaller cluster of time periods to learning each day and assign a greater number to practicing. Depending on the training method and time involved, training tools can include any or all of the following: trainee text, instructor's guide, practice exercise book, operations manual and equipment reference guide. The first three tools should be parallel in format and content. The equipment reference guide should contain a usable index to guide trainees to the answers to any and all questions. Special care should be taken to include a glossary of terms.

Training methods:

- Vendor training: Does an actual trainer handle the instruction, or is training accomplished by means of a package with a staff member on the premises to answer questions? Most vendor packages have not been effective because of the lack of modularity and monitoring techniques and because the packages were developed on too generalized a basis to be really acceptable to each individual.
- Augmented vendor training: Before you augment vendor training, be sure you have an experienced and very competent person to develop the lesson plan, a competent instructor and time to test the material.
- Your own training program: If you choose to develop your own program, keep in mind the operator's present knowledge. If the module is not adequate for the operator's present situation, he will either be bored or unable to follow the program. Define the training method you will be using:

☐ Lectures are effective in putting across concepts or previewing training points, but they do not permit the feedback necessary for monitoring.

☐ One-on-one training is the best kind available because you can monitor and tailor the training program to the individual trainee. However, it is very costly in time and human needs.

☐ Self-study is a method often used by correspondence schools or prepackaged instructions. It is important that an instructor ascertain the learning curve if you use this method.

☐ Programmed study has great potential if it is properly designed. Training is set up so that a trainee must complete one step correctly before continuing to the next.

☐ Interactive computer programs combine an automated form of programmed learning with the benefits of one-on-one training. Upon successful completion of the initial step, the interactive computer program provides the trainee with the next step to be learned, then the next and so on. Programming for this type of training has to be extremely friendly and forgiving so that trainees are not intimidated.

- A training program can be developed for you by a training firm. Few guidelines are needed, but you should be aware of what the training firm is capable of doing, pick a firm familiar with the field, define your particular requirements and, most important, work closely with the training or consulting firm.

Procedures/forms: Different procedures will have to be established and forms will have to be designed or redesigned. These should include:

- Operator's manual containing:

☐ General information (operation hours, leave, lunch, coffee breaks, luncheons and use of telephones).

☐ Security (procedures for opening the office, system start-up, classified work or security clearance).

☐ Media storage and files (operator's standard procedures for handling media and storing documents at different intervals).

☐ Work flow and control (work assignments, operator's instructions, originator and typist information, equipment, document numbering, forms and so on).

☐ Production standards.

☐ Instructions on completing the different forms.

☐ Samples of different types of work and setups.

- User's manual containing:

☐ Purpose and telephone numbers.

☐ Rough draft correction and proofreading marks.

☐ Document processing procedures.

☐ Definition of acceptable inputs.

☐ Handwritten or typed copy instructions.

☐ General dictation techniques and procedures.

☐ Procedures for different types of work and setups with actual samples.

- User orientation program covering:

☐ Why the new center or procedures were established.

☐ How the center can be used.

☐ Goals and ideas of the WP center. In connection with introducing these goals, you should arrange a visit to the center, so trainees know the staff there.

- Forms. Design and create the forms you will need, keeping in mind the need to speed paper flow. Make sure the forms are tested before they are included in

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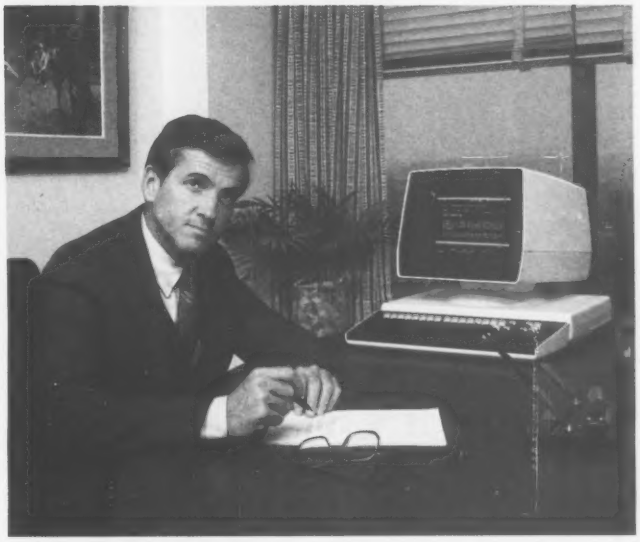

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$$= \sum_{j=1}^{K} X_j^2 V''(\beta_j) + \sum_{\substack{i=1 \\ i\neq j}}^{K}\sum_{j=1}^{K} X_i X_j \mathrm{cov}''(\beta_i, \beta_j) + \sigma^2$$

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POSTIMPLEMENTATION ACTIVITIES

Cost analysis: You must now analyze the effectiveness of the system and its ability to meet projected goals. You should test performance standards every six months.

Refinement and review: Through cost analysis, management reporting system and performance evaluation, determine what changes are necessary in the initial setup to refine and amend those procedures to make them more effective and/or more realistic. You may have to rewrite procedures and policies to accomplish your goals. Conduct a user satisfaction survey to make sure the procedures are productive, the type and quality of work performed is acceptable and the originators are satisfied with the end results.

Equipment enhancement and expansion: If the results of your review are not satisfactory, you must determine whether the fault lies with the users or operators, the type of equipment already in-house or procedures that have been applied. You might have to reconsider the equipment already in place and think about adding peripherals or some other kind of compatible equipment.

CONCLUSION

An office automation review and analysis consists of seven basic steps:

- Assess the work environment and organization. Develop a complete understanding of the structure, people, work habits and goals of the organization to guide the study team in performing its functions and establishing a baseline for current costs and methods.
- Measure current work methods. Accumulate sufficient data to determine areas of concentration, those most susceptible to automation, the work environment and the total work volume.
- Analyze work performed and assess automation needs. Arrange the raw data into understandable information to determine the need and to demonstrate the advisability of introducing automated office equipment.
- Develop recommendations. Define the extent, if any, of OA applications in terms of workable recommendations, including type and size of staff, procedures, equipment, organization, space design and costs.
- Set up an implementation plan. Provide the organization with a timetable of all events and actions to implement recommendations.
- Accomplish installation and start-up. Equipment installation, department procedures, stocking of supplies and a phase-in of work load are addressed. Initiate records to measure gains, performances and meeting of goals and deadlines.
- Do a postimplementation evaluation. Upon installation and operation of the system for a period of six months to one year, take measurements of productivity gains, equipment usage, work flow, work patterns, organization and work values to determine the effectiveness of the system and its ability to meet projected goals. OA

Garon is a consultant in office automation and planning strategies and is headquartered in New York.

IMPLEMENTATION TIMETABLE

Introduction to change: *never stops.*

Ordering equipment: *1 to 3 weeks.*

Environmental considerations: *1 week.*

Facilities modifications: *as necessary.*

Establishing training program: *1 week.*

Developing procedures: *1 week.*

Staffing activities: *1 to 3 weeks.*

POSTIMPLEMENTATION TIMETABLE.

Report to management: *weekly.*

Determine performance standards: *1 week.*

System indicators: *as necessary.*

Reevaluate system: *every 6 months.*

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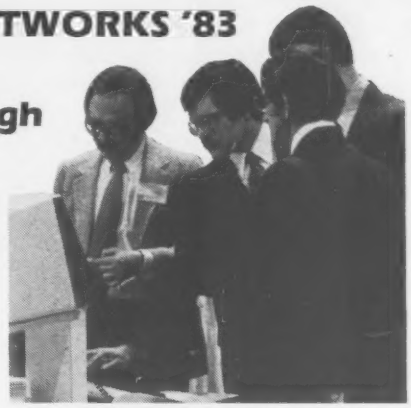

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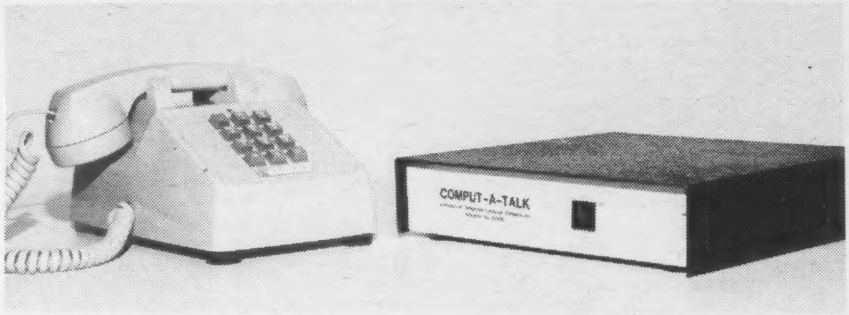

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DEC

A WINNING HAND?

Minicomputer giant Digital Equipment Corp. has decided to get tough in the office. Slow to enter the OA marketplace, DEC has watched competitors announce products over the last several years while holding its own cards close to its chest. Speculation began surfacing over whether the company would aggressively enter what was deemed a necessary market, but last October DEC began playing its own cards — many of which, according to industry observers, could turn out to be aces.

Insistent the lag was not through lack of commitment, Julius Marcus, vice-president and group manager for OA

BY ANN DOOLEY

at DEC, stated, "We simply wanted to make sure we could deliver what we announced." DEC was not late into the market, insisted Kenneth Olsen, its president, who maintained DEC's word processing and electronic mail have been around for a long time. Those functions were simply not marketed as OA tools before this, he said.

Now, however, DEC wants to be recognized as not just an OA company, but a top contender in the market. DEC officials seemed to make it a matter of almost personal pride to have the company treated as a leading player in the OA game.

Admitting the delay in entry may have harmed the company in terms of market identification, DEC has made it a primary goal to turn that problem around. The market is embryonic and still up for grabs, Marcus said, and the late entry was a price DEC was willing to pay. "We would have loved to have been there earlier. But we decided it was better to be late and predictable — and also have the staying power and the ability to deliver on commitments and live with the customer over the long haul — than to announce early and jerk people around."

Olsen agreed. "It would have been immoral to have people unhappy, waiting in line for a product while we go pushing off into another area," he stated.

If a company moves ahead too quickly or does not think out its product line well, it eventually pays for that in reputation, and for DEC, it wasn't worth the risk, Marcus continued. David Terrie, senior analyst, office automation, at International Data Corp. (IDC) agreed. "DEC's deliverable product line and applications are strong enough to keep pace with other vendors, which are experiencing time lags between announcement dates and delivery times."

Noting that DEC's market strength is not great now, Terrie predicted its relatively low market share would begin increasing in response to DEC's new line of products.

But is it already too late for DEC to catch up? In the case of desktop computers, for instance, the competition is grabbing hold of market shares with a vengeance. Although DEC plans to sell 100,000 personal computers in their first year out, IBM is already far ahead, shipping 12,000 Personal Computers monthly. IBM's gigantic installed base of users appears to be lining up to buy just one more computer from IBM's comprehensive offerings.

Admitting the delay in entry may have harmed the company in terms of market identification, DEC has made it a primary goal to turn that problem around.

And the Maynard, Mass., minimaker has more to worry about than IBM's market share of 12% in dollars of U.S. shipments. Apple Computer, Inc. and Tandy Corp. hold 16.2% and 21.6%, respectively, of the desktop market in terms of dollars. In addition, traditional office suppliers and microcomputer companies are all attempting to grab hold of the market and not let go. A DEC official admitted that more than 300 companies are already out fighting for customers.

However, that is not stopping DEC from claiming it is the company most strategically situated to provide users with all their OA needs. "We've been in the word processing business with reasonable success for several years," Marcus said. Although not the leader in the field — DEC has 5% of the clustered WP market — the company is the leading manufacturer of terminals and distributed processing — strong elements of the office.

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ing," Marcus stated. A number of vendors have announced products lately and then have been forced to pull them back. Flash-in-the-pan marketing is not DEC's style, he said, noting that the company, which holds nearly a 40% share of the minicomputer industry, generally pursues a conservative line, from both a fiscal and a marketing standpoint.

IBM and Wang Laboratories, Inc. are the vendors the company will be competing against most heavily. But DEC, which just celebrated its 25th anniversary, believes anything can happen in such a new industry. "DEC isn't complacent. We know it's a tough business," Marcus said.

Historically, IBM and DEC have approached their markets from different directions. Now that both are converging on the office, however, they may find themselves competing on more of a head-to-head basis than ever before. DEC, second only to IBM in unit sales, is better known in the scientific and technical arenas than in the office environment, but it is banking on its strong penetration in the MIS departments of large corporations to gain an inside track into the office. DEC retail and outside stores, too, will address markets previously unsolicited by the company, and recent products are increasingly being targeted at the new user on a personalized and user-friendly scale.

Undaunted by its competitors, DEC contends it will be one of the top three vendors in OA and the top vendor in personal computers and departmental computing systems. "The products and capabilities we have today are those that many of the competition are promising to deliver in the future," Marcus stated. According to DEC, its breadth of product line is one of its greatest advantages. The company is in a prime position because of its range of personal computers, departmental computers such as the VAXs, the network interconnect capabilities, the ability for all of that to work together and its quality ser-

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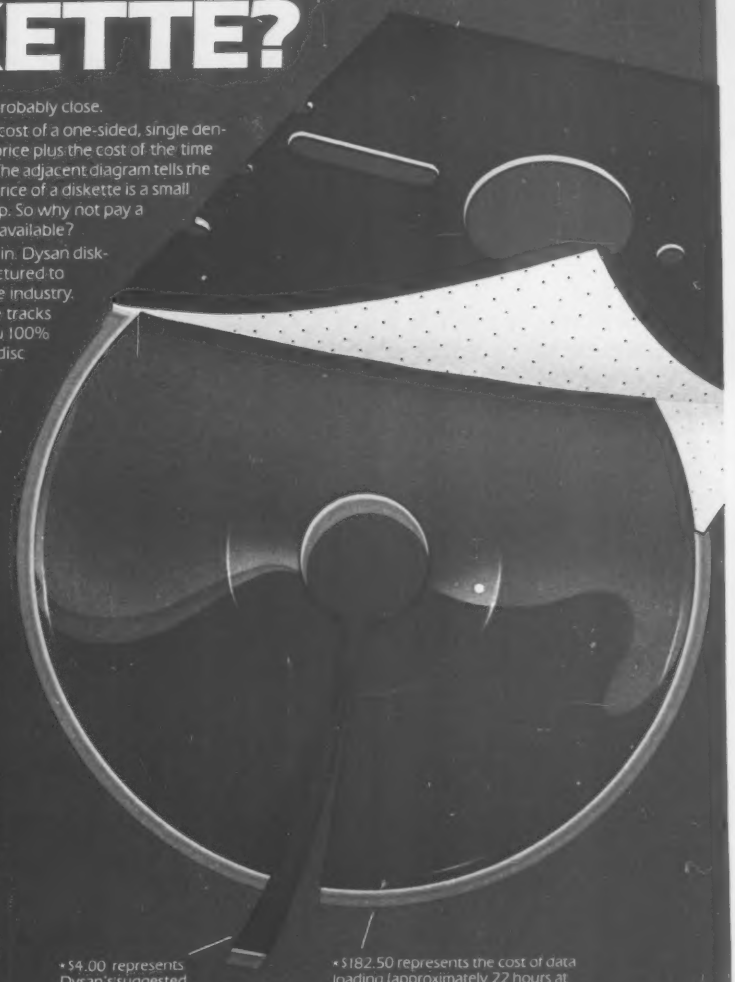

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vice and support, the executive stated.

The key to DEC's success will be how well the newly announced personal computers will be received, according to Marc Schulman, vice-president at First Boston Corp. Schulman rated the personal computers highly and noted that right now the name of the industry game is to place products on people's desktops. DEC did "less than a superlative job of word processing," so by focusing on the professional and manager, it can avoid fighting the battle on terms dictated by Wang — a company that scored early in the secretarial arena.

DEC's wedge into the market, according to Schulman, will be its "excellently designed set of machines plus its large and satisfied installed base and in-place sales force."

Quick to extol its strengths, DEC will also admit to some problems. The company realizes it has to build a name for itself in a relatively unfamiliar marketplace. Citing image as the company's weakest area, Marcus stated, "We aren't first in customers' minds because we only started last October. But we're going to change that."

Schulman agreed the Massachusetts-based company needs to identify itself with a new user group. "Questions about DEC's throughput capabilities exist, particularly in regard to how well these machines will perform in an office environment. Historically, the company's products have not placed a premium on extracting large amounts of data, but rather on processing in the machines." But DEC is "so damn large" it is bound to be a presence in the marketplace, especially as it embarks on a strong new product cycle with specialties in functionality and integration, he concluded.

DEC would not reveal its anticipated revenues from OA-related products, but Marcus noted it would be a "big chunk." The numbers are big because the market is big. The minimaker's strategy will be to provide the best products and service and the highest credibility of any of its competitors, he claimed.

Since last October, the company has introduced a wide range of products: Office Plus, a full line of personal computers ranging from simple to complex, Decmate II, the second version of its integrated office system called All-In-1, the first deliverable Ethernet products and an Ethernet development schedule plan, a laser printer, a computer-aided design system, a second version of its electronic mail package, voice capability and video disk coupling to personal computers and graphics standards plans, as well as a number of other products.

The overall product line includes good individual products that can be integrated and remain transparent to the user, a DEC official said. DEC believes the building blocks for its OA strategy are to be found in its range of personal computers; departmental computers like the VAX; networking, including Decnet, which provides for a wide variety of interconnect capabilities; and reputable service. And the key to it all is the architecture that allows users to build a range of products that work together, Marcus stated. The products were designed with the same architecture, data bases, human interface and overall networking scheme, so today's products will work with tomorrow's, and products from the high and low ends of the line will work together, DEC maintained.

DEC is "so damn large" it is bound to be a presence in the marketplace, especially as it embarks on a strong new product cycle with specialties in functionality and integration.

The pace of product introductions has been fast and furious over the last year. Key strengths for the company, according to IDC's Terrie, include its product architecture, similar file structures and the capability of access to IBM files. Also, because of its size, users know DEC will be around for them in the future.

Commenting on the personal computers, Terrie noted that DEC will "sell the pants off those systems." The company hopes to gain a competitive edge through aggressive pricing. DEC's low-end personal computer reportedly costs less than the Xerox Corp.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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820 and approximately the same as IBM's Personal Computer. Similarly, Decmate II costs less than the Displaywriter or Wangwriter.

"DEC's All-In-1 system is as strong an entry in the market as anyone's," Terrie noted. It offers self-sufficient systems that can act as terminals and also provides menus that can be used by entry-level users or disregarded by more sophisticated users. Responding to market requests, DEC has emphasized self-training to help the user along — an appealing feature in today's office environment. Prior to All-In-1, a complaint leveled against DEC was the lack of user-friendly systems; the system design was said to be too complex and DP-oriented. DEC claimed its products are now tested by company secretaries. If the products are difficult to learn, they are reportedly sent back for further design work.

Some people make the mistake of assuming DEC is married to Ethernet. That is not the case.

The company will become a total supplier of OA equipment, in the sense that if DEC does not supply the actual equipment, it will provide access to the capability, DEC officials stated. In terms of what's ahead in product introductions, DEC is expected to introduce this fall an interactive video interface that can be hooked up to TV cameras, a TV line or video disk.

DEC espouses an open network so that the user is not locked into any one vendor. For DEC, this means providing communication over normal phone lines; local-area networks; both baseband and broadband; private branch exchange; long-haul nets, including satellite and microwave; and twisted pair — in other words, communication levels between its own computers, to gateways and to public networks. DEC has committed itself to working toward a local-area network standard via Ethernet to further facilitate the aim of standardization.

Some people make the mistake of assuming DEC is married to Ethernet as its only communication capability and that is not the case, Marcus asserted. Customers are looking for an overall strategy. No one can expect users to come so firmly to one way of thinking that they are locked into a single vendor, he noted.

Standardization is good only to a point, Olsen added. "In some areas, standards limit creativity, but in terms of keyboards, graphics or communication standards, we like to encourage it," he said.

The company's much touted integration has not yet been totally achieved. DEC's electronic mail package cannot run on its PDP-11 series, although the company said it will do so in the undisclosed future. Electronic mail runs on the VAX series because mail, by its very nature, is used on larger systems. It should not be inferred that PDP-11s are regarded as secondary or that interest is lacking, DEC said.

In another break in the integration chain, the Decsystem 10s and 20s cannot use the VAX electronic mail, but use a previously introduced package, Decmail/MS. This will also be updated eventually, according to DEC.

DEC officials repeatedly claim the most serious mistake an employee can make is to mistreat a customer. Marcus asserted that sales were sometimes curtailed in order to maintain quality of delivery and commitments to customer base. "It's immoral to go out and get a new customer when others are already backlogged," he asserted.

It is company philosophy that to lose administrative control internally or to lose quality or service is only self-damaging. "Growth is not a goal. What is a goal is to do well in good markets and build strong products, and the growth will take care of itself," Marcus maintained.

DEC's growth rate has been consistently high — $3.8 billion in revenues last year, up 21%, and net income growth of 22%. This has been accomplished without ever acquiring another company and in an industry in which the overall growth rate is falling, as are unit prices on equipment.

Company projections have been met as far as its OA market penetration in terms of numbers, profit and volume or, as Marcus stated, "DEC is on target and picking up steam." OA

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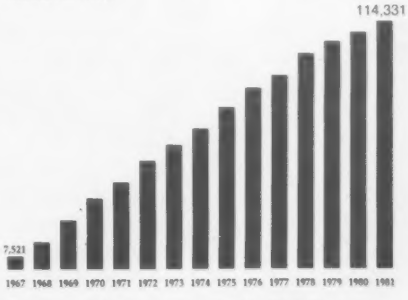

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MONTHLY OPERATING COST REPORT
• Total manufacturing operating costs were $8,424,000 below Forecast in September. Time related spending was reduced $1,815,000 of which $301,000 was due to reduced costs primarily in energy and manpower during curtailments, principally at Oakland, Santa Barbara, Houston, and Boulder.
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WHY SO POPULAR?

THE INFORMATION RESOURCE CENTER

The information resource center is rapidly assuming a dominant role in integrating office systems and data processing into true office automation. It offers an introductory bridge between DP and end users who require automation but can't wait for DP to provide an application program for them. Unlike some difficult-to-sell aspects of OA, information resource centers are enthusiastically accepted. Why do we have such overwhelming acceptance by large and smaller organizations? The answer is need and economics: need for better and more rapid information and economics in the sense of cost-justification. A recent study of a large organization's center showed labor, software and hardware savings in excess of $1 million per year.

How did the information resource center evolve? The concept can be traced to the U.S. Navy, which decided in the early days of World War II that the introduction of new technology — such as radar — necessitated a new way of conducting operations. Equipment and operators were centralized in a single nerve center called the Combat Information Center, and information was then disseminated to those needing it, some of whom had radar repeaters to verify the information they were receiving. The basis of both the Combat Information Center and the information resource

ILLUSTRATION BY TOM MONAHAN

BY DANIEL J. O'CONNELL

center is a simple formula: right information, right person and right time.

Today the introduction of new technology such as personal computers, interactive systems, decision support systems, English-type query languages, interactive graphics and application packages are making the information resource center a nerve center similar to the Combat Information Center. The information resource center is a physical site providing hardware, software and consulting support to allow rapid information retrieval. As appropriate, repeaters in the form of terminals and personal computers are provided at key locations. The end users are executives, planners and managers.

New technology is not the sole reason for the rapid acceptance of the information resource center. Traditionally, the responsibility for providing computer-based information rested with DP through the medium of management information systems. A major lament of this method is that the long development time involved in such systems makes them nearly obsolete by the time they are operational. In short, they solve old problems, but not new ones.

The mission of the information resource center is to allow authorized users at all levels within the office to use technology to satisfy their information requirements.

The situation is further complicated because about 60% to 80% of the computer programming resources of corporations are dedicated to maintaining and enhancing existing systems. This has caused a visible two-year backlog in developing new systems and an invisible backlog in excess of four years. (Office personnel/end users, informed that it will be two years before any effort can commence on their requirements, don't even bother to prepare a system request.) Under such conditions, it is not surprising that planners, professionals and executives welcome an alternative.

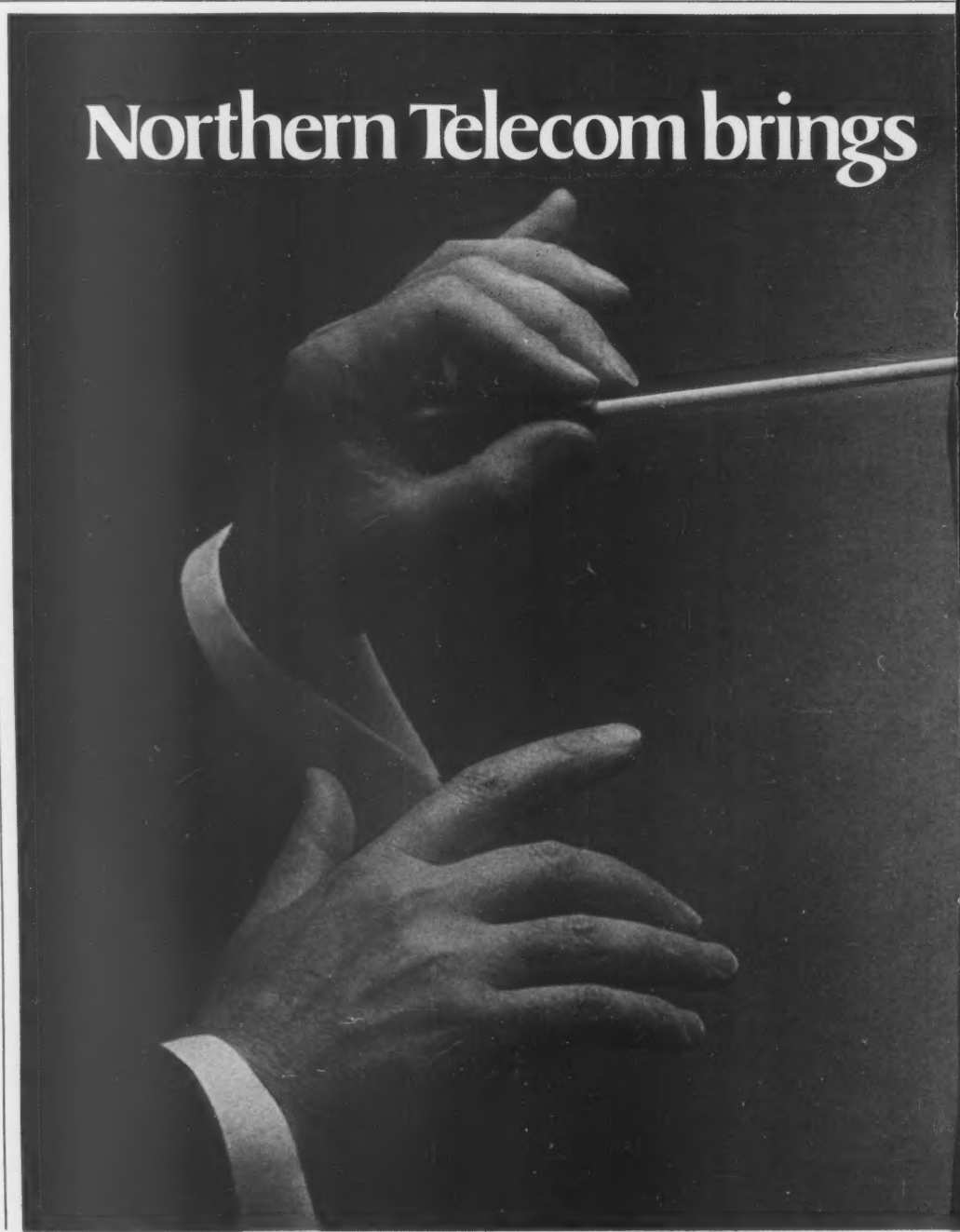
The mission of the information resource center is to allow authorized users at all levels within the office to use technology to satisfy their information requirements. The benefits include:

- Better information for decision making.
- Improved traditional DP service to the corporation.
- Timely retrieval of information by executives on their terms.
- Cost reduction and cost avoidance.
- Increased office productivity.
- Improved image.

What type of company is a candidate for a center? Fortune 500? Smaller organizations? The decision to implement a center in a larger organization is easy; nearly all larger organizations have such a requirement. Smaller organizations currently using a time-sharing service or an in-house minicomputer typically find ample economic justification through the introduction of personal computers into the center.

The typical components of an information resource center follow:

- Decision support systems provide professionals with the ability to examine several alternative solutions to a business problem and to gauge their impact. Such systems are typically resident on the main computer and are accessed through terminals in the center and executive office spaces, although some systems are available for use on personal computers.
- Rapid query language such as Focus, Mark IV and SQL allow professionals to write their own applications in an English-type language. With a conservative dollar savings of 6:1 over traditional applications development, the cost reduction is considerable, combined with the value of rapid information.
- Color graphics is becoming an important part of OA systems and is finding its niche in the center. Color charts and graphs provide a picture that both is easy to interpret and alleviates the need for extensive narrative and/or/ discourse. Truly a picture is worth a thousand words.
- Personal computers represent the initial entry into the information resource center for many organizations and are widely accepted. They are an economical means of providing unique information that is applicable at the division or department level and not



necessarily at the company level. Consideration should be given to using the center to provide research on personal computers and to serve as the central source of procurement for the organization.

• Software application packages are an integral element of information services and the information resource center. Some packages (such as decision support systems, statistical modeling and query languages) are directly related to the center, while others (such as material requirements planning and payroll) are peripherally related. Prior to the information resource center, package selection was like a Boolean exclusive or statement. Either the executive or DP manager made the selection with predictable results: "That isn't what I wanted," or "Now that I have it, I don't know how to make it work."

Organizations have found the information resource center not only solves this problem, but also provides a joint testing ground for all packages. Similarly, this joint venture concept is extended to resolve problems caused by the proliferation of private data bases, incompatible equipment and duplication of effort.

Does the information resource center herald the end of traditional DP as we know it? Not quite! Centers can satisfy many of the information requirements of end users, but some requirements will continue to dictate the traditional systems approach. Traditional operational systems, such as order entry and general ledger, should not be developed in the information resource center. Nor would the center be the correct place to develop an airline reservation system booking several million people a year.

As noted earlier, maintenance of existing systems accounts for about 60% to 80% of the present DP work load. With a reduction in effort on existing systems of 30% (resulting from executives writing their own applications), the center allows DP to spend more time on developing new applications by reducing the existing backlog.

How do you gain acceptance of an information resource center in an organization? Don't you find a lot of resistance to change?

Implementing an information resource center by placing software for information retrieval and data manipulation directly in the hands of executives and decision makers is resisted more by DP professionals than by end users. A personal experience I had in this area should prove helpful as an example.

I first implemented an information resource center in a university setting. After review and analysis, we bought a nonprocedural English-type query language, and the vendor conducted a training class for the executives who would be using it. DP chose not to get involved.

Changing requirements from year to year had prevented a stable system's being developed to provide daily budget status as the fiscal year wound down. With the introduction of the information resource center, decision makers at all levels were provided with information that was current and had not required a hectic manual compilation. Other special information such as admissions, grade and course statistics and student summaries were also available for the first time. (Rapid results help explain the popularity of the information resource center. Furthermore, to be successful, choose initial applications with high visibility within the organization.)

Does the information resource center herald the end of traditional DP as we know it? Not quite!

One problem that evolved in the university situation was that some executives spent too much time in writing and rewriting their queries. Our objective was not to make executives into programmers, but to give them an easy-to-use tool. We decided to establish consulting positions to provide educational services to assist the executives in writing their queries. Use of the consulting service was optional, and it became quite popular. This also brought DP onto the team because they had the expertise to come up to speed rapidly; as successes mounted, they wanted to know what we did right.

In broad terms, the implementation of an information resource center should go through a series of phases. The following phased schedule is recommended:

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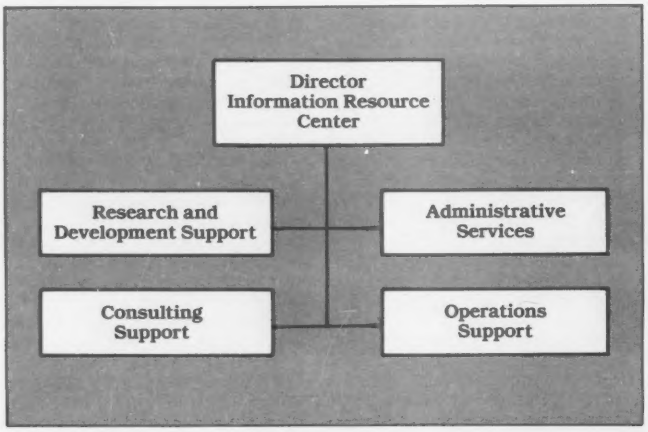

1. Select a user-friendly language for the host computer.
2. Implement the use of the language, starting with key areas of the corporation, and provide a physical location to provide training and assistance.
3. Provide statistical packages for data manipulation, including regression analysis and modeling.
4. Introduce personal computing.
5. Provide access to data base management systems using special query languages.
6. Select and install a decision support system accessible from the information resource center and the executives' office area.
7. Provide interactive graphics capability.

The implementation strategy does not address the staffing and organizational aspects. Many organizations select a person with a strong DP background as the director of the information resource center. Considering the wide array of hardware and software, this makes sense from an efficiency standpoint. However, since information resource centers have evolved because DP has failed in some measure to understand the business implications of information systems, it is more appropriate to have a non-DP executive as director. Such a person should bring a strong business perspective and rely on DP professionals for the more technical aspects of the information resource center.

It might appear that implementation of an information resource center would necessitate organizational change. This is not the case. Typically, the center fits into an existing organization either within DP, OA or administration. A typical structure for the information resource center is given in the figure above.

It appears that the information resource center is the panacea for many of the information problems facing organizations. It provides a logical bridge between traditional data processing and office automation and puts the tools for information retrieval directly into the hands of the decision maker.

As we are so frequently reminded, however, there is no free lunch; the information resource center is no exception. Some of the problems to look for include:

- Technical orientation instead of business orientation in the information resource center.
- Duplication of effort because several executives write similar application queries.
- Poor dissemination of information because only one part of the organization has information that affects other areas.
- Excessive computer usage due to executives using the computer like a toy.
- Unauthorized updating of information in data bases, resulting in errors and executives' having different information.
- Security in the form of unauthorized access to sensitive information.
- Executives spending too much time on writing queries.

These traps and pitfalls are not meant to discourage implementation, but rather to mark the danger areas in the channel. With proper planning, one can avoid most of them.

In summary, do it! Implement an information resource center. It's fun to make decisions when you have good information. Besides, your competition is doing it. OA

O'Connell is a senior consultant at International Management Services, Inc., based in Framingham, Mass.

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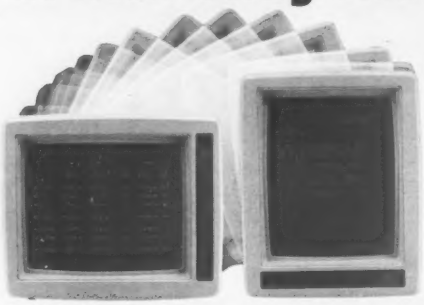

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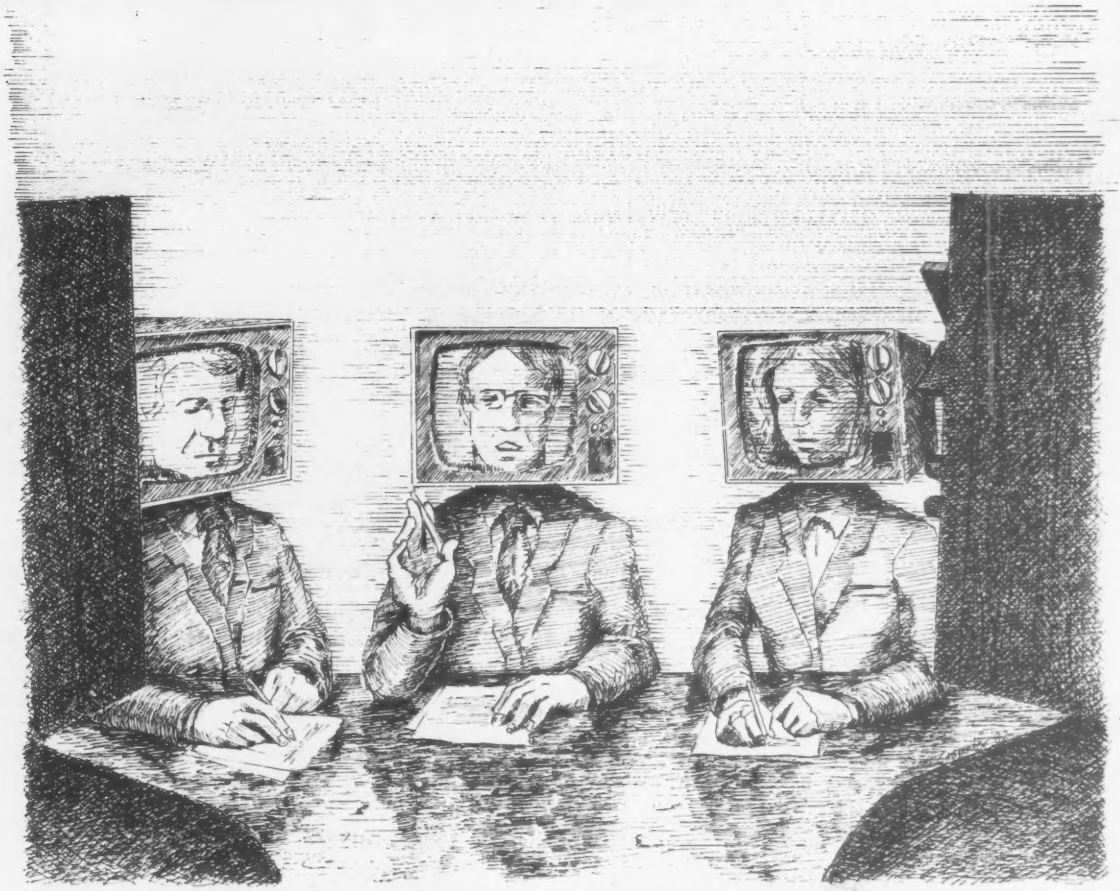

ILLUSTRATION BY SHELDON T. CARPENTER

AT&T first announced the idea of Picturephone more than 20 years ago as a way of changing the way we communicate. The public's loud response of "so what!" made Picturephone the proverbial solution in search of a problem. Today, videoconferencing is touted as a substitute for the high cost of travel and a way to increase managerial productivity.

While not the only answer to our communications needs, videoconferencing is a powerful tool to consider when automating our offices. To be successful in using videoconferencing, users must determine when its use is optimal and when it is not the best solution to business communications needs.

First, let's define terms, limiting ourselves to a discussion of private in-house conferencing systems. As public meeting services such as AT&T's Picturephone Meeting Service become widely available, companies without their own facilities may increasingly rent videoconferencing services on an as-needed basis.

Videoconferences use two-way full-motion video combined with two-way audio for a simulation of a face-to-face meeting. Participants in two (or more) cities can see each other and maintain visual contact during long-distance conferences.

Videoconferencing is only one form of electronic meetings or teleconferencing, however.

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BY EVELYN S. WILK

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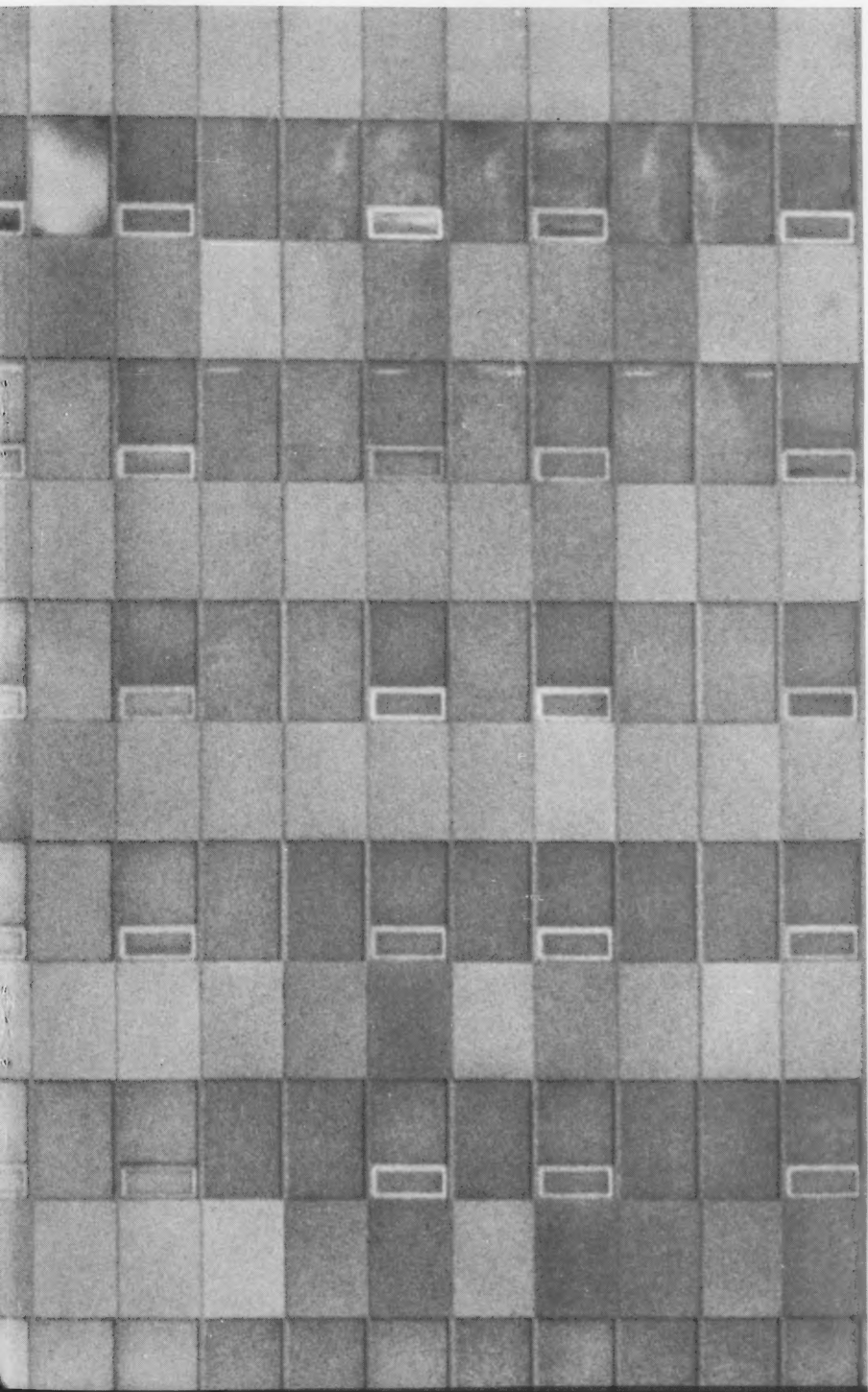

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A418

conversation to a link-up of a dozen or more cities; participants sit in specifically equipped conference rooms with microphone-activated telephones. It is the least expensive way to add remote people to a meeting and requires little advanced planning from a technological standpoint.

Augmented audio is audio conferencing plus some graphics transmission. The voice conversation may be augmented by facsimile, two-way electronic blackboards or freeze-frame or slow-scan video. One participant has described the effect of an augmented audio conference as that of sitting in a lecture with your view of the speaker blocked, but with a clear view of the slides.

Computer conferencing is an ongoing conversation between interested parties who log on at their personal convenience to add new material or to critique each other's ideas. Participants need not attend at the same time. (Computer conferencing is not, however, electronic mail, where discrete messages are transmitted.) The chairman of the computer conference will set deadlines for response, and companies with experience said that use of computer conferencing significantly reduces decision-making time.

Video seminars combine one-way full-motion video with two-way audio. They are excellent for formal presentations, such as a vendor's new product announcement. The formal presentation is often made from a professional studio so that sophisticated broadcast techniques can be used (such as combinations of live action and videotape). The audience gathers in large groups in many cities and watches on TV monitors. They ask questions via a separate two-way phone link. When a question is asked, participants in all cities hear it.

A brief review of these five types of teleconferencing shows that only audio and computer conferencing can be used on an ad hoc basis. Augmented audio, video seminars and videoconferencing require special facilities and advanced planning for scheduling both attendees' time and facilities use. Because facilities can be quite expensive, a company should not consider installing a videoconferencing room without examining the potential benefits.

Most obvious among those benefits is the reduction in travel time and expense. To calculate the costs for a long-distance meeting, you must include not only plane, hotel and other travel expenses, but also the time value of the meeting participants. When you add in the opportunity costs — could those sales managers have been generating new sales instead of sitting on that plane? — the cost of holding the meeting skyrockets.

Recent studies at the University of California at Irvine found that 75% of business travel is for meetings, and a Bell System study showed that 60% of those meetings are intracompany. If only half those meetings could be accomplished electronically, a company could potentially eliminate 20% of its travel budget.

Studies have shown that 75% of business travel is for meetings, and 60% of those meetings are intracompany. If only half those meetings could be accomplished electronically, a company could potentially eliminate 20% of its travel budget.

The benefits of videoconferencing go beyond saving travel expenses; a videoconference can have subtle advantages over a face-to-face meeting. Because time is limited by technological considerations, people come well prepared. They also tend to have more consideration for each other, allowing the speaker to finish a thought completely rather than interrupting in the middle. In our experience, meeting participants felt that sometimes individuals had a better chance to be heard completely in the videoconference than in a face-to-face meeting.

Video conferencing is not the answer to every communications need. It is important to realize that videoconferencing is not a direct substitute for a face-to-face meeting. In fact, it resembles a phone conversation much more closely than it does a personal meeting.

Almost everything that can be done in a videoconference can

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also be accomplished by augmented audio. The major difference is that videoconference attendees see each other's reactions to their ideas. In a group planning meeting, reactions can be very important. However, in a technical discussion, attendees spend most of their time looking at graphics, not at each other. In fact, in an augmented audio conference, the participants are not distracted by each other and can pay full attention to the material under discussion, which makes it ideal for technical discussions. As people become more comfortable with the concept of electronic meetings, augmented audio conferencing should grow even faster than videoconferencing.

As people become more comfortable with the concept of electronic meetings, augmented audio conferencing should grow even faster than videoconferencing.

With the cost of videoconference rooms running upwards of $250,000 each, why would a corporation install from two to four or even 12 or more video rooms when augmented audio can accomplish most of the same goals at half the cost? The answer lies in a basic shift in management styles in the U.S. and around the world.

In recent years, a number of larger companies have begun to move from a pyramid to a matrix organizational structure. In the traditional pyramid organization, job functions are clearly defined and vertical reporting relationships set. In the matrix organization, however, there are many dotted-line relationships, with job functions and responsibilities spread laterally across the organization. Decisions can no longer be made individually, but must be reviewed with groups of peers to determine how one part of the matrix affects the others. The result is a dramatic increase in the number of meetings required at all levels of management.

A parallel development, the rise of quality circles or Japanese-style participatory management, will require even more meetings in the coming decade. And in our larger companies, the members of a quality circle or a matrix peer group may very well not reside in the same geographic location. Finally, let's add another management technique that has become more widespread: the concept of short-term project teams.

The need to seek an alternative to travel becomes even more apparent. With everybody off traveling to a meeting, who is left to run the business and generate revenues?

Each of the three types of meetings just described requires as much interaction as possible. The members of a quality circle want to see each other's reactions to their ideas and concerns, and the sense of participation in a project team is heightened when you can see each other in the meeting in a way a phone call cannot duplicate. Videoconferencing is the only one of the five teleconferencing techniques that meets the need for full interaction.

Arthur Andersen & Co. participated in the four-year AT&T field trial of videoconferencing from 1977 to 1981. When the trial started, the company's management included four cochairmen, each in a different city. Video conference rooms were installed in the Chicago headquarters, New York, Washington, D.C., and San Francisco (our Geneva World headquarters participated by telephone link only).

Each room had several cameras activated by microphones in the conference table. The speaker's voice automatically seized the camera. An additional overview camera gave a picture of the entire group. Each room had two video monitors, one showing the current speaker and the second showing an overview of local participants. Participants in the speaker's city saw themselves and the last speaker. A slide projector interface allowed 35mm slides to be transmitted directly to the screens in the receiving rooms. A stationary camera was also available to send pictures of documents under discussion.

One major objective of our trial installation was to allow these partners to meet weekly. During the trial, a meeting was scheduled

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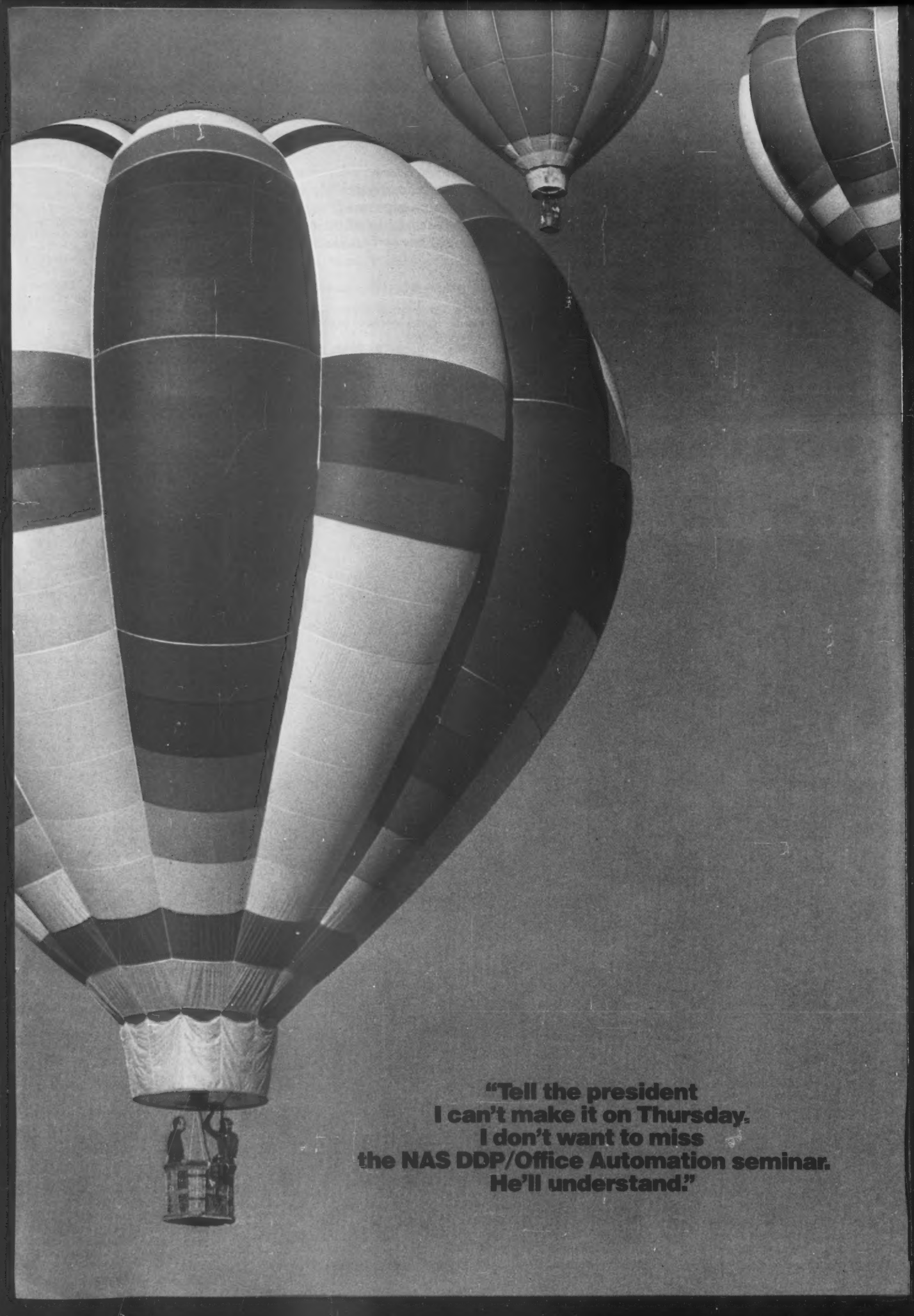
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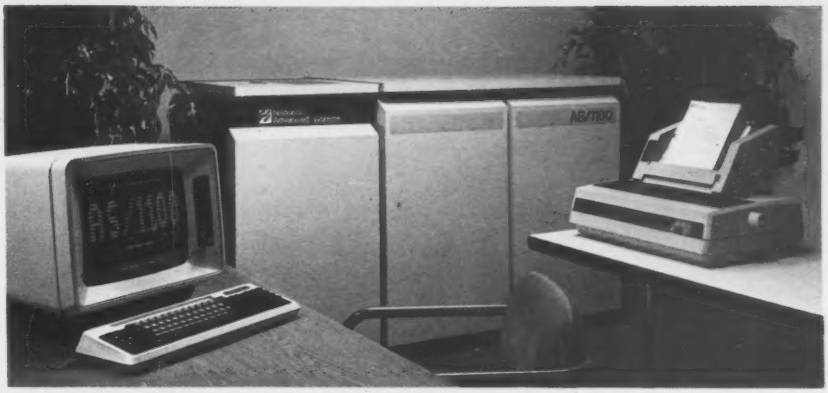

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OA 9/29

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every Monday from 10 a.m. until noon, Chicago time. Not all the managing partners could meet each week, and additional people were often invited to discuss specific topics.

The partners who participated in the weekly meetings agreed it would have been impossible any other way to keep them all so well informed on day-to-day management. The four cochairmen were simultaneously informed, in depth, on a timely basis. Issues were discussed as they arose, rather than waiting for monthly or quarterly-after-the-fact reports.

There were drawbacks, of course. The technology was not as reliable then as it is today. Occasionally, meetings were canceled because of technical problems. Since four locations were on-line at the same time, it was sometimes awkward for a participant to seize the video. Overall, however, the partners felt the system was well worth the cost.

What did we learn from the four-year trial, and what have others learned since then that you can use to help assess the potential for videoconferencing in your company?

First, you should determine if you are a candidate for any form of electronic meetings. Base your analysis on your geographic dispersion, type of management structure and number of intracompany meetings.

Then you should consider videoconferencing as just one tool in a kit bag of potential electronic meeting tools. And you can follow some general guidelines to help determine when each of the tools is most useful:

• For ad hoc conferences, where two or three individuals want an impromptu meeting, audio conferencing is appropriate. If a number of people who exchange information have terminals and are geographically widespread, an ongoing computer conference may be even better.

• Technical discussions using data or graphics are excellent candidates for augmented audio. Participants can pay undivided attention to the material under discussion and even make changes if electronic blackboards are in use. In the typical corporation, a majority of meetings suitable for automation may well fall into this category.

• Large formal meetings are a natural for video seminars, with long-distance question-and-answer sessions providing interaction. You can include many more participants than in a face-to-face seminar and at a fraction of the per-person attendance cost. A number of companies have been very successful in using video seminars for new product announcements.

• Full-motion videoconferences are best for planning groups, project teams and other groups that need visual feedback for ideas and want a full sense of participation from remote locations. Because meetings can be scheduled more often without disturbing individual schedules, participants all keep better informed of group activities. Although the number of meetings suitable for videoconferencing may well be smaller than those suitable for augmented audio, videoconferencing may be important enough to the corporation management to warrant the additional cost of full-motion video.

Videoconferencing has matured from the proverbial solution in search of a problem to a viable answer to real business needs. In the 1980s, many companies will be installing a combination of video and augmented audio conferencing to meet a significant portion of their business meeting needs. OA

Wilk is a manager in the Chicago Management Information Consulting Division of Arthur Andersen & Co.

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WHAT'S MORE IMPORTANT THAN $$?

Cost-Analysis

PHOTO BY GEORGE DILLON

A common assumption states that automation leads to better information, which leads to increased productivity, which in turn leads to increased profits.

If an employee is willing and able to take advantage of useful information provided in a timely and accurate fashion, then the potential for dollar saving does exist. If, however, the employee fails to take advantage of the information provided, then the organization has a very expensive automated system that is not being utilized and is simply costing money.

Many organizations believe automated systems will result in instant savings through immediate productivity payoffs. Automation does not, however, always lead to increased productivity. An electric can opener, for example, results in little time savings, minimal improvement in the quality of the product and higher cost than a manual system.

Unfortunately, no magic formulas exist to cost-justify equipment that costs several hundreds of thousands of dollars. Many factors affect the economic viability of introducing new systems into an organization. For instance, everyone involved in planning must share the same understanding of terms in order to reach a consensus and to communicate this consensus to senior management before an OA study is undertaken.

BY JAN DUFFY

Because the ultimate objective of OA is to improve business performance on the whole, individual benefits may be very difficult to define. To determine the extent to which a business will benefit from any new system, the organization must document its corporate objectives. Many organizations have not taken the time to define these objectives and have instead assumed that everyone within the organization is working toward the same goal. This is often an incorrect assumption; research may show that serious interdepartmental competition exists.

When corporate objectives have been established, the contribution made by each individual position or task, as well as the potential for improvement, should be evaluated. These studies provide an opportunity to evaluate methods and procedures, as well as to question whether the task is even necessary. If this opportunity is ignored, the chance to save many dollars will be missed and the result may be a lack of justification for revised systems.

A major problem in the evaluation process is the vast difference in office functions. Most office jobs, however, involve four major categories of tasks: desk work, meetings, communications and problem solving. A major complaint among those doing such tasks is the lack of thinking time. This is somewhat disconcerting, since many of those complaining are responsible for major decision making, leading one to question the quality of decisions. Automation of some tasks may provide this very valuable thinking time.

Automation of office systems does not change the information handling cycle of originating, processing, storing, retrieving, distributing, destroying or keeping information, which continues ad infinitum. The implementation of advanced office systems emphasizes different activities within that cycle, but, since the destruction and/or retention of information usually leads to the origination of more information, the cycle itself will continue. However, it may move faster and that speedup may produce benefits.

In the past, organizations have emphasized management of their most important resources — people, time and money. The advent of automated systems has not and must not change this emphasis. We should attempt to improve our management of these resources with the addition of automation. Although it is important to maintain an intelligent awareness of technology, neglect of the human factors can result in very costly staffing problems.

In order to determine the potential profits of automation, it is important to conduct a thorough review of the current office operation, including relationships, productivity and costs. Find out who communicates with whom, using what methods and how often. Determine present levels of productivity and establish a common understanding of what productivity means.

Defining or evaluating productivity will mean considering many factors, such as:

- Quality. It is of little significance for a person to produce many thousand widgets if 90% of them are of poor quality or if there is a limited market for widgets. It is also of little value if one high-quality widget can be made in the same time it previously took to produce three acceptable-quality widgets, unless a compensating higher financial return can be expected.
- Employee satisfaction. Job dissatisfaction will result in decreased morale and decreased product quality and quantity.
- Customer satisfaction. If the introduction of seemingly efficient automation results in poor communication with the customer, subsequent loss of sales and related income quickly negate the value of the improvements.
- Efficiency and effectiveness of the group or individual. These can significantly affect the productivity picture.

To determine the potential profits of automation, it is important to conduct a thorough review of the current office operation, including relationships, productivity and costs. Find out who communicates with whom, using what methods and how often.

Two techniques, cost substitution and value-added, are commonly applied to cost-justifying automated systems. With cost substitution, equipment is implemented and staff numbers are reduced. Used in assembly-line situations, it has been the cause for much fear on the part of the blue-collar working group.

The value-added technique has been most popular in justifying automated systems for the professional or management worker. With this technique, the addition of automated systems permits performance improvement. Unfortunately, it is extremely difficult to relate or use the value-added technique and project hard dollar guaranteed savings. In today's economically constrained environment, many organizations insist upon seeing hard dollar evidence of savings prior to approval of equipment acquisition.

A number of organizational issues, if ignored or addressed poorly, can result in a significant negative financial impact. Problems of territoriality related to integration can result in several groups within an organization conducting their own studies. This duplication of effort is expensive and inexcusable. The biggest difficulty and expense occurs when these individual groups are permitted to acquire equipment on their own with no coordination whatsoever. One need only look at the problems that arise with piecemeal installation of word processing equipment to anticipate those that could occur in the larger area of OA in general.

Unfortunately, OA is still not well defined nor well understood. Consequently, many people think they understand what office automation is, when in reality they do not. As a result, many organizations are encountering a lack of internal expertise or, even more dangerous, the proliferation of misguided internal expertise.

It is important to determine where OA fits into your organization. No one answer fits all situations; your answer will depend to a great extent on the current structure of the company and whether it is a well-managed organization.

Employees who are well trained and able to utilize the information provided can give rise to increased generation of ideas; the presentation of information often stimulates other information. Unfortunately, many corporations have not trained their users or potential users well. Nor have they provided orientation sessions that outline the applicability of recommended systems to specific jobs. Consequently, systems installed are frequently underutilized.

Underutilization is not always the result of poor training. It can also be the result of a poor equipment choice. If the equipment installed is determined by the users to be unsuitable, it will not be used.

Many people do not understand the full potential of automation and it is extremely difficult for them to envisage how it can assist. If the worker is encouraged and taught how to use the modeling and projection capacity of automated systems, it is possible for recommendations to be tested prior to attempting implementation, and the chances for successful implementation increase.

The potential for establishing a corporatewide data base opens up many possibilities within an organization. Information has traditionally been treated as an individual resource, rarely shared. The development of information as a corporate resource promises long-term benefits that are mostly immeasurable, however. The capabilities of automated systems encourage the increased use of creative management. Very often, the first solution to a problem is accepted when, in fact, the creative way to solve any problem is to develop at least two solutions, if not three. If automation can be used to encourage creative problem solving by means of modeling and projection, the decision-making process will almost certainly become more effective.

A needs analysis investigation can consume a great deal of employee time since a number of very important questions must be answered:

- What are you doing now?
- How much does it cost now?
- How can the present system be improved?
- What will the improvement cost?
- What will be the impact on personnel?
- How long is the process going to take?
- What are the potential savings?
- How will the new system benefit the organization in the future?

When these questions have been covered, a strategic plan can be developed. The largest one-time costs involved in OA may be facilities adaptation, provision of air conditioning, cabling and so on; initial equipment acquisition; and the training and orientation of staff, which must be conducted on a phased basis. Ongoing costs include updates to equipment and software and the purchase of maintenance contracts.

If a management group is asked to depend on an automated data base in order to be effective, the project manager had better plan for a crisis. It is absolutely imperative that all information be backed up and that alternate arrangements be made for times when the system is nonfunctional. The cost involved in handling crises can be reduced greatly by effective planning.

In the long run, the biggest advantages of OA will emanate from its ability to render the employee independent of both time and location. With automated systems in place, it is possible to perform a large portion of one's job whenever and wherever desired, with few limitations. Unfortunately, it is incredibly difficult to place a dollar value on this work. OA

Duffy is a partner in Duffy, Bentley, Nelson-Turner Consulting Group Ltd., office systems consultants headquartered in Toronto, Ontario.

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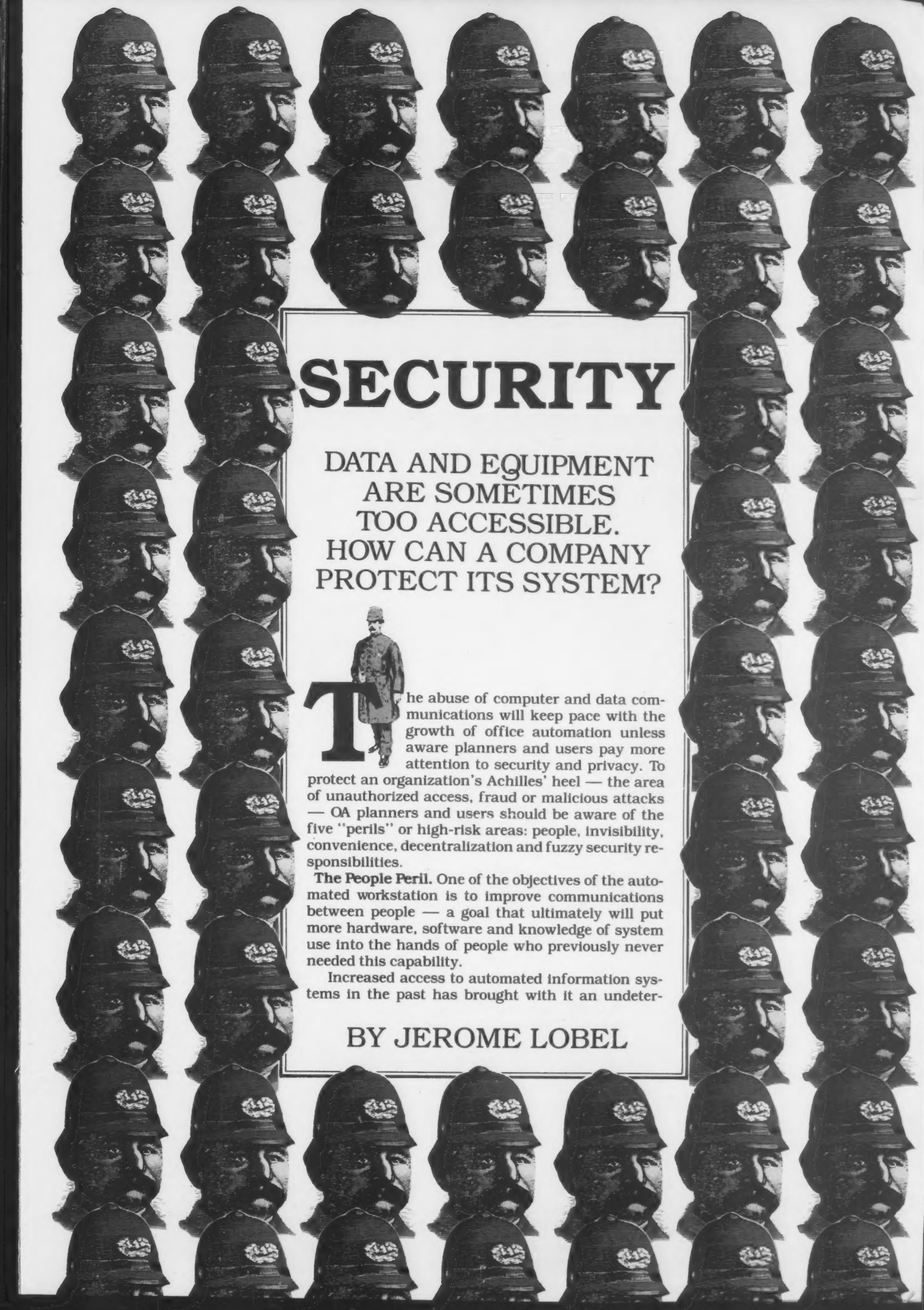

SECURITY

DATA AND EQUIPMENT ARE SOMETIMES TOO ACCESSIBLE. HOW CAN A COMPANY PROTECT ITS SYSTEM?

The abuse of computer and data communications will keep pace with the growth of office automation unless aware planners and users pay more attention to security and privacy. To protect an organization's Achilles' heel — the area of unauthorized access, fraud or malicious attacks — OA planners and users should be aware of the five "perils" or high-risk areas: people, invisibility, convenience, decentralization and fuzzy security responsibilities.

The People Peril. One of the objectives of the automated workstation is to improve communications between people — a goal that ultimately will put more hardware, software and knowledge of system use into the hands of people who previously never needed this capability.

Increased access to automated information systems in the past has brought with it an undeter-

BY JEROME LOBEL

mined but reportedly significant increase in computer abuse and white-collar crime, including incidents of financial fraud, theft of trade secrets, privacy violations and costly disruptions of normal operation through maliciously compromising the computer.

By 1990, it is anticipated that more than 50% of the American work force will have computer-usage knowledge.

It is also estimated that more than a twelvefold increase in communication by electronic mail will occur by 1995 (from 930 million electronic messages in 1980 to over 11 billion by 1990). Word processing and related workstation sales are expected to triple, to a $36 billion industry by 1990.

Since the opportunity for unauthorized computer access and abuse probably will increase with the implementation of OA systems, a security strategy will be needed to deal with the problem.

The potential for abuse takes on even greater significance when we look at what seems to be the goal of the minicomputer industry — widespread use of home computers, many with communications capabilities.

Security Strategy. Since the opportunity for unauthorized computer access and abuse probably will increase with the implementation of OA systems, a security strategy will be needed to deal with the problem. Its main thrust should be directed toward imparting a sense of security awareness to the system planner and user, as a motivation to provide adequate protection for the system.

Invisible Technology. Experienced computer users are usually eager to learn about hardware, software and communications technologies, if it will help them get better results from their systems. OA users, on the other hand, are more interested in getting their work completed and are less concerned with the mechanics of how the job gets done.

In other words, it is implied that simple access to a terminal and a basic understanding of its operation and application will be enough for OA users. Thus, with the software, hardware and communications technologies made sufficiently "invisible" to users, they will be able to concentrate on learning how to use the system.

From a time and motion engineer's standpoint, this approach may be fine. But, from the standpoint of system security and privacy, there are a few critical drawbacks.

For instance, it is possible that a lack of user concern and responsibility concerning the system's supporting technical components may lead to complacency about critical security considerations, such as terminal location, communications line protection, password usage, network organization, data base accessibilities, program change and modification control, data and personnel classification procedures and system backup and recovery requirements.

We have long recognized that it is the lack of security measures and internal controls in these areas that have contributed to computer abuse problems in existing information systems. The experienced DP user has been bombarded with warnings, educational material, audit reports and "war stories" about computer crimes and other abuses to the point where system security no longer is hidden behind a curtain of technical illiteracy. The OA/personal computer user may not have this education or experience.

Security Strategy. OA users need to realize that they cannot take security and protection for granted, that they cannot assume that their system suppliers and DP departments have eliminated all the risks. They should be introduced quite early to a security strategy that includes some form of "up front" education to prepare them for changing much more than their present paper processing procedures.

Peril of Convenience. As designers and implementors strive to increase user productivity, they sometimes exclude or bypass desirable internal controls, or computer security and privacy safeguards, in favor of improvements in throughput productivity or message and inquiry turnaround time.

In addition, increased produc-

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FEATURE COMPARISON CHART

FEATURE	VISUAL 50	Hazeltine Esprit	ADDS Viewpoint	Lear Siegler ADM-5	Televideo 910
Tilt and Swivel	YES	NO	NO	NO	NO
Detached Keyboard	YES	NO	YES	NO	NO
N-Key Rollover	YES	NO	YES	NO	NO
Audible Key Click	YES	YES	NO	NO	NO
Menu Set-Up Mode	YES	NO	NO	NO	NO
Status Line	YES	NO	NO	NO	NO
Full 5 Attribute Selection	YES	NO	NO	NO	YES
Smooth Scroll	YES	NO	NO	NO	NO
Line Drawing Character Set	YES	NO	NO	NO	NO
Block Mode	YES	YES	NO	NO	YES
Insert/Delete Line	YES	YES	NO	NO	YES
Bi-Directional Aux Port	YES	YES	NO	YES	NO
Columnar Tabbing	YES	YES	NO	NO	YES
Independent RCV/TX Rates	YES	NO	NO	NO	NO
Powerbock User Programmable	YES	NO	NO	OPT	NO

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tivity is often achieved by reducing controls or "nuisance" (extra) activities which might inconvenience the system users or operators. Typical examples of these internal control weaknesses include:

• Password Usage — common or shared passwords, infrequent changing of passwords, short and easily remembered passwords and not changing passwords after an employee has changed positions or has been terminated.

• Terminal Usage — convenient but high-risk locations, allowing people to log on and leave the terminal area without logging off the system, not requiring a password concealment procedure during log-on, override procedures that allow users to bypass internal control checks and other system protection features and inadequate error display on terminals for user corrections.

• Software and Logical Weaknesses — reduction of input and output processing controls; shared programs and files without concern for careful restriction of user read, write, execute and append permissions; inadequate program change authorization and control; and inadequate verification of reentered data.

• System Backup and Recovery — inadequate off-site storage of critical programs and files, unreliable logging of DP backup that is sent to or received from off-site or remote storage area, inadequate backup of critical processing and communications requirements and inadequate testing of backup and disaster recovery systems.

• Auditability — inadequate logging of transactions including errors and system interruptions, inconsistent monitoring and reporting of errors or possible unauthorized transactions or systems usage, inadequate implementation of programmable controls, no manual checking of control figures and poor error-correction procedures.

Security Strategy. The problem is that convenience is stressed as one of the most important attributes of the new office automation technology. Convenience, however, must not mean that few safeguards or internal controls will be needed.

A sound security strategy for system users here may require as much, if not more, consideration than other types of information systems.

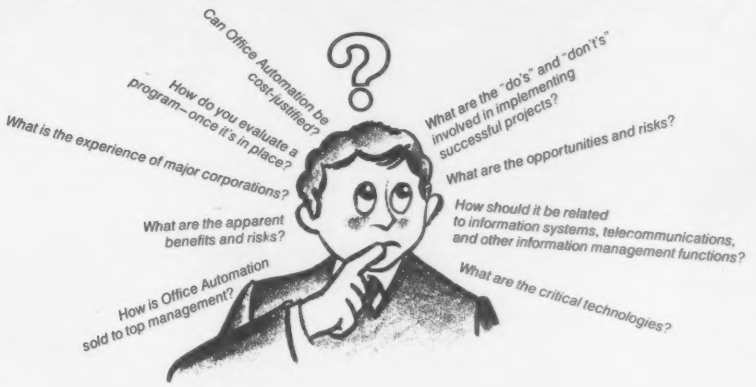
Peril of Decentralization. One of the primary objectives of OA is to bring the power of new electronic technologies to more people. It is generally conceived that the office is the last frontier before the home. It may also be another example of how offering new computer hardware and software can precipitate an almost clocklike pendulum swing from centralized to decentralized information processing and back again.

An unprecedented proliferation of new terminals and automated workstations is anticipated. Many of these installations will contain far more than a simple keyboard/printer or CRT-type terminal. Many OA concepts envision large numbers of intelligent terminals, minicomputers (including peripherals such as printers and mass storage devices) and various assortments of computing systems, ranging from super microprocessors to large-scale host computers. By far, the majority of the special applications that fall under the OA umbrella include important network and communications-oriented capabilities.

Convenience is stressed as one of the most important attributes of the new OA technology. Convenience, however, must not mean that few safeguards or internal controls will be needed.

The essence of many of the OA proposals is to reduce paperwork and to increase people productivity by furnishing information processing capability wherever it is needed. System users, therefore, will not have to be dependent upon one or more host systems to perform many vital functions, including the storage and retrieval of data needed by the workstation. Even if the workstation is connected to one or more host computers or other terminal locations in the network, it will derive much of its inherent capability from its own hardware, software and local data bases.

Thus we justify the term decentralization.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CALENDAR OF EVENTS

Day 1

8:30-9:00 a.m. Coffee, danish—get-acquainted meeting

9:00-9:45 a.m. The Big Picture: What Office Automation Is—and Is Not

9:45-10:45 a.m. Bring The Picture into Focus: Organizing and Developing a Program for Your Company

10:45-11:00 a.m. Coffee break—informal discussion

11:00-12:00 noon. Basic Considerations in Planning Program—Moving It Along Without Setbacks

12:00-1:00 p.m. Luncheon—informal discussion

1:00-2:45 p.m. Keeping Your Office Automation Program in Focus: Organization and Direction-Setting Strategies

2:45-3:45 p.m. Common—but Costly—Mistakes to Avoid in Planning and Organizing Your Office Automation Program

3:45-5:00 p.m. What You Absolutely Must Know About the Technology of Office Automation (including cost considerations and payout expectations)

5:00-6:15 p.m. Cocktail reception—opportunity for extended discussion—

Day 2

8:30-9:00 a.m. Coffee and danish, informal discussion

9:00-10:30 a.m. Sizing Up Your Company's Needs and Requirements: a Tested, Professional Approach that has Proven Its Value

10:30-10:45 a.m. Coffee break—and more informal discussion

10:45-12:00 noon. Once Your Needs are Identified—How Do You Go About Solving the Problems?

12:00-1:00 p.m. Lunch—and informal discussion

1:00-2:30 p.m. Vendor Selection—a Sensible, Tested Approach to its Challenges and Opportunities

2:30-2:45 p.m. Coffee break and informal discussion

2:45-4:15 p.m. Implementation: How Do You Get the Project Up and Running?

4:15-5:00 p.m. The Future: What Comes Next? How Can You Profit by Starting to Get Ready Now?

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In the movement from centralized to decentralized capabilities that accompanied present and past computer systems and communications networks, security and privacy vulnerabilities grew more critical. This occurred because users were implementing more and more sensitive computer applications. During each new system phase, they became more dependent upon their electronic information systems. Even implementing independent or physically separate computer systems (to avoid unauthorized access) did not necessarily solve the problem.

At present, it appears that OA applications will encounter the risks of both decentralization and centralization. The risks could include such mundane possibilities as someone physically stealing the computer, the data base, the system software or the application programs. Unauthorized on-line access to the system also would be a vulnerability. If the workstation is part of a communications network or a distributed system, unauthorized access by a remotely located individual could present additional threats.

Security Strategy. The security strategy that can best minimize the risks cited above will include system protection or risk reduction measures culled from experience with both centralized and decentralized systems. The centralized system (with limited communications and network capabilities) can provide a higher degree of user separation or isolation. (The same would be true for a "stand-alone" system such as a minicomputer with no external communication.)

On the other hand, a decentralized or distributed system (with significant network and communications capabilities) has such advantages as improved system backup and more resources to draw upon for protection capabilities such as encryption, secure network processors and certain on-line monitoring features. Obviously, OA users will have to pay particular attention to their own system applications and architectures to determine their own security criteria and requirements.

Peril of Fuzzy Security Responsibilities. Many modern information system organizations include a formal system protection activity. It may range from little more than a loose committee of concerned individuals from data processing and a few key user departments, to a heavily staffed and professionally trained systems security administration activity. The existence of such organizations usually depends upon the size of the company and its DP activity and the sensitivity of the work performed for user departments by information systems. With a few notable exceptions, smaller DP users or organizations using service bureaus tend to overlook the need for self-help in the area of system protection.

Unfortunately, most OA applications tend to make system users dependent upon protection built into the system by its designers and maintained by its technical operations staff. This arrangement constitutes both a weakness and an opportunity for systems users. Problems are likely to arise most frequently with small workstation components using few terminals, which are operated with a minimum staff. If today's smaller systems and terminal users are typical, there will be a lack of system security caused by too few knowledgeable people and a lack of internal controls.

Recent incidents of computer abuse and computer-oriented crime show that users, as opposed to the technical programming and operations staff, are often guilty of system compromise and abuse. Unauthorized system access and manipulation of input and output are easily within the capability of individuals employed in user organizations. In addition, there tends to be a serious lack of physical security in small system user departments.

Security Strategy. The opportunity for self-help here is significant. System abuses are almost entirely caused by some form of unacceptable personal behavior, rather than technical problems. For this reason, a large part of the solution to the protection of OA systems must reside with the user.

Clearly, the most important elements in an OA security strategy should be:

- Proper indoctrination of system users in security awareness.
- Adequate training in the maintenance of internal controls related to terminal usage, physical system access, password usage and protection monitoring.
- A written policy with regard to the security and privacy responsibilities of system users and penalties associated with violations.
- Delegation of authority to at least one individual at every user location or workstation area to maintain security protocol and to report any violations to the appropriate individual.
- The inclusion of users and their ideas in the OA planning and implementation process. User contributions that will favorably impact both productivity and security should be incorporated into the system implementation.

These five key "perils" or risks should be dealt with during the planning phases of every OA project.

Fortunately, potential users of OA systems have an opportunity to assure themselves that their new information systems will be designed and implemented with security in mind.

It is a responsibility they should not take lightly. OA

Lobel is manager of computer security at Honeywell, Inc. and heads the company's computer security education program.

Office Technologies

Exploring New Trends

Office automation (OA), which is often thought of as an objective or a fixed end in itself, is really a process of integrating computer and communications technology with human patterns of office work. The process can be seen in as many different stages as there are sizes and types of organizations. In large white-collar organizations where pressures to automate have been the greatest and investment in office automation the heaviest, the process has come to the point where the basic building blocks are ready for assembly into more sophisticated systems.

If previously, various departments could act as virtually autonomous buyers of office equipment, now the leading-edge scenario of OA favors a return to more centralized planning and decision making.

By Frances Johnson

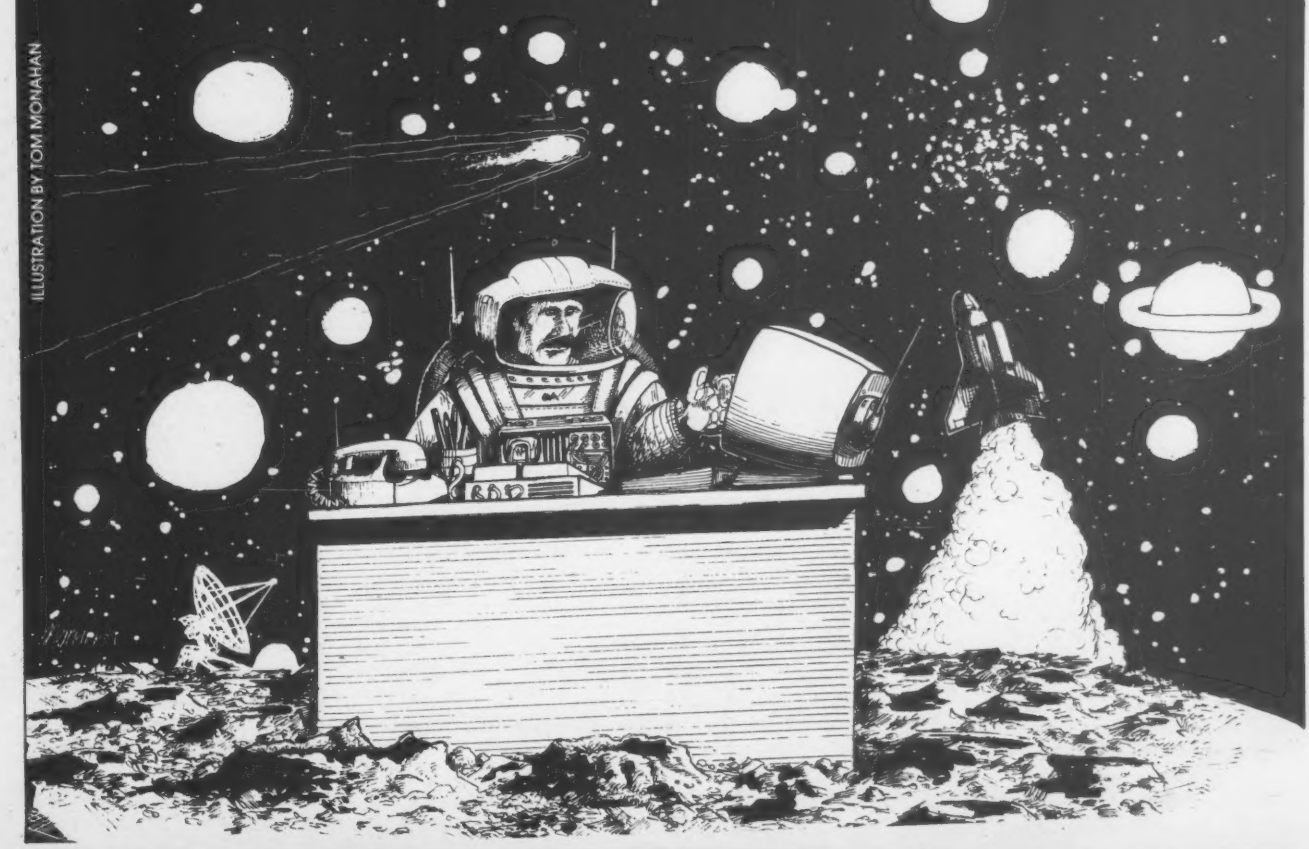


ILLUSTRATION BY TOM MONAHAN

That scenario, characterized by advanced communications networks, hints at changes that go beyond doing today's jobs faster, better or cheaper. It suggests that human systems in the office will be increasingly interwoven and interdependent. The process of discovering the benefits of systematic automation will call for new, companywide standardization and coordination on a level beyond anything yet dealt with in the OA process.

The envisioned system of cooperating hardware and software — made from building-block units that may enter the organization at various times, in various places — will provide significantly advanced services. These services will ultimately encompass the storage, retrieval, manipulation and communication of every medium of information exchange in the office. The technological barriers that now assign these media to separate sorts of equipment will be gradually removed.

In the process, the hardware and software employed will take on increasingly generic aspects. Data processing and word processing will be terms for describing what people do with a system, not the system itself. A range of capabilities will be accessible from multifunctional workstations.

With access extended to more and more office workers, it will become increasingly difficult to categorize users as either "word people" or "data people." The system will draw in more workers who are themselves "multifunctional." Therefore, it will gradually discard the interface that facilitates some type of information processing at the expense of others. It will not be acceptible to offer inferior data processing capability to some users or inferior word processing capability to others. The basic characteristics that provide each function with both power and ease of use will be extended throughout the system.

To large user organizations that plan for the creation of these systems, the prospect of working with only one or a few equipment vendors becomes increasingly attractive. Therefore, suppliers in the OA marketplace have taken care to demonstrate the breadth and flexibility of their product lines. Word processing companies are crossing over into DP, while DP companies are gaining ground in the office by touting their WP capabilities.

Furthermore, the pervasiveness of microprocessor intelligence and memory in most equipment for the office has made it possible for whole industries to take on new roles as OA participants. Office copiers are on the verge of transformation into nonimpact output printers. Telephones are appearing as computer terminals. Traditional office equipment suppliers will have to learn to interface with an array of electronic devices tied together in a network.

The long-term potential of the systems approach to OA is a redefinition of work space and time capable of revolutionizing business activity, just as home appliances revolutionized household labor and established some of the groundwork for major societal changes. OA can compress the temporal and spatial distances between thought and action. One wishes an item of information, and it is delivered instantaneously. One wishes a month-end status report, and a typeset-quality document with graphic trend analysis is produced within the hour. One wishes a notice of price change to go to all the company's far-ranging salespeople, and the message is entered into the memory of each one's portable telephone in the time it takes for a single call.

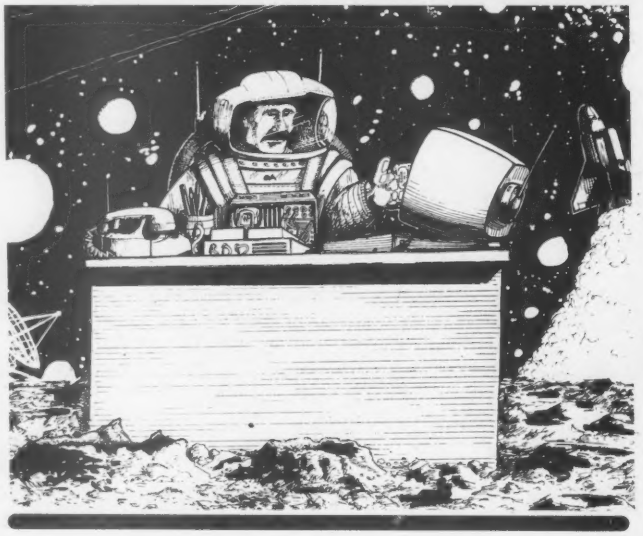
The systems approach to OA is a redefinition of work space and time capable of revolutionizing business activity, just as home appliances revolutionized household labor.

With these kinds of services and others at stake, there is growing demand for a long-term view in planning office automation. The technological infrastructure to be established is far-ranging. Furthermore, advanced technologies will make it possible to reshape the business organization into more effective form. The departmentalization and managerial overhead needed to control information by archaic means will give way, over the long run, to new patterns of communicating and new work objectives.

Meanwhile, traditional procedures of cost/benefit analysis are proving to be inadequate or at least incomplete when applied to OA. That analysis favors investments that produce measurable increments of improvement in efficiency or effectiveness in exchange for predictable costs.

The cost/benefit ratio, therefore, can only approximate the outcomes of automation. The cost side tends to be overly focused on initial cash outlays while the benefit side of the ratio attempts to attach hard-dollar value to the concept of office productivity. Productivity is a term borrowed from the factory environment where tangible, quantifiable outputs are produced. Office workers produce intangible services as well as tangible products. And since these services and products are not typically offered for sale, their value in dollar terms is undefined.

Productivity analysis in the office, therefore, falls back on counting up the potential time savings from some contemplated step in automation and assigning that time a value based on employee salaries. When used as a foundation for cost/benefit analysis, this approach tries to arrive at a cost-reduction or cost-avoidance rationale for OA. It does not usually value benefits returned in the form of additional services or products produced, at least not in a hard-dollar sense. Even the cost avoidance credited to OA is to a large extent uncertain, because many products now are addressing users who have not been directly supported by technology of a similar kind.



Product costs, therefore, must be low enough to counteract the effects of uncertainty. To achieve such cost advantages, a certain amount of technological infrastructure is required as a base from which to launch new products. The chart on Page 58 outlines the major prerequisites and market growth time frames for several important OA applications.

The cost avoidance credited to OA is to a large extent uncertain, because many products now are addressing users who have not been directly supported by technology of a similar kind.

The infrastructure for voice store-and-forward is in place today in the form of approximately 50 million U.S. business telephones. The problem of "critical mass" that has been cited as a barrier to other types of network products is effectively bypassed.

Furthermore, the full benefits of this kind of system are not delayed by a lengthy learning period. Human communications by telephone may be enhanced almost immediately without an introductory period of disruption. The enhancements include both a more effective method of message-handling — hence fewer work interruptions — and a powerful message distribution system that can speed up communications among dispersed work groups such as salespeople, field service people, management teams and others.

Electronic mail is an OA product that must face the problem of critical mass. The infrastructure of display terminals that it requires is not yet fully established in most organizations. Neither are the communication standards by which diverse types of terminal products can be brought together in a network. Today, with more than two million office word and data processing workstations in place, electronic mail users still number well under 5% of the office workstation users. The critical mass needed to permit communication and to drive down hardware costs is estimated to be roughly two times larger than today's installed base of office workstations. Consequently, electronic mail will not generally be cost-justifiable as a primary application until after 1984.

Rapid growth in office graphics terminals will be dependent on future developments in output technology. When low-cost nonimpact printers begin to compete effectively with daisy wheel and other impact character printers in text-based office systems, graphics generation will become an attractive add-on facility. Progress in the whole area of image processing, in fact, will be paced by the progress of nonimpact printing.

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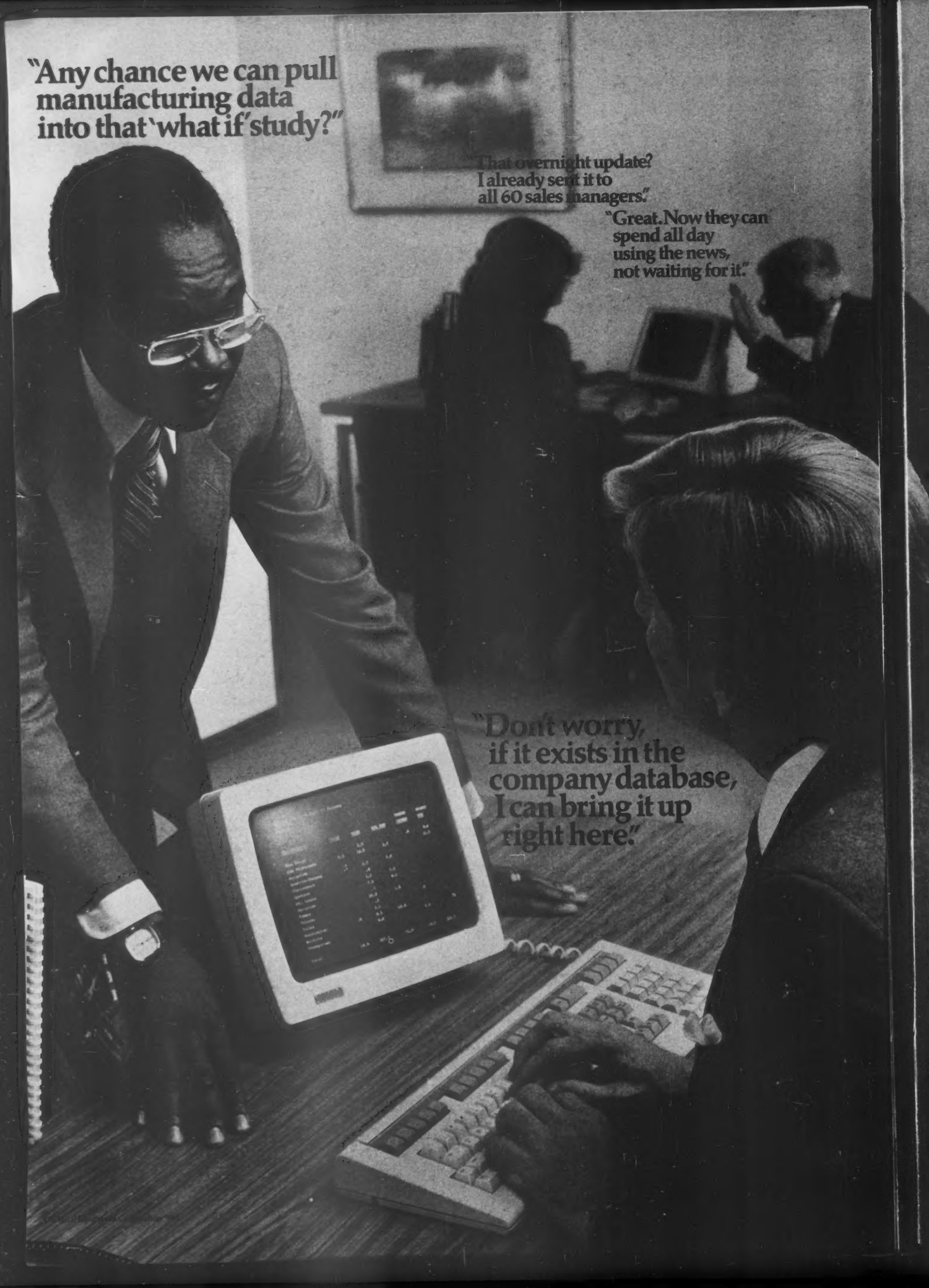
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Infrastructure Requirements and Timing of Selected OA Products

OA Product	Major Infrastructure Prerequisites For Significant Market Growth	Market Growth Period (start date)
Voice store-and-forward	50 million business telephones	1982
Electronic mail	5 million office workstations	1984
Office graphics terminal	100 thousand low-cost nonimpact printers	1987
Management workstation	Interactive data base access using natural language commands	1987
Video teleconferencing	Significantly lowered transmission costs	After 2000

As long as paper is firmly embedded in office systems, the state of printing technology defines the range of information that can be encompassed by OA.

After 1987, graphics capability will enhance workstation products designed for use by managers. The major infrastructure requirement in this area, however, is for software and systems that extend the accessibility of corporate data. Much of the responsibility for developing this infrastructure lies within user organizations. New structures must be established internally to protect the security and integrity of the data resource as it is distributed to new levels of the organization.

Today, this critical component of the managerial workstation is missing, and vendors cannot create a package to supply it. The facilities that are offered instead — calendar management, tickler files, WP, electronic mail and so on — fail to appear for the same reason that inspired their development, the value of the manager's time.

The manager does not want more information of essentially the same kind he receives now. There is already too much of that. The manager wants a store of up-to-date summary information, within easy reach, to be used at his discretion.

Video teleconferencing is another OA application that holds significant promise for the future, but lacks the necessary context for impressive growth in the near term. While per-hour video transmission costs remain high, video conferencing will be employed only on a limited basis to replace certain kinds of unessential travel. At this level of use, industry is not encouraged to market major improvements in video hardware and software.

However, increases in data traffic brought about by all kinds of electronic communications, including home applications starting in the 1990s, will eventually provide the volume to bring prices down. Technological refinements that will be feasible at the new cost levels will attract uses for video conferencing that go beyond replacing travel. Other sorts of information vehicles, such as telephone and mail, will then be supplemented by video.

In summary, not all OA products offered today serve the short-term objectives of cost-justification. Cost considerations ensure that new systems will be built on the foundation of what has gone before, whether it be prior investment in hardware or the established work patterns of human beings. Other products have limited application today, but serve as signals to the industry and to the user community that the vendor will provide options and commitment for the long term. Short-term changes will be perhaps less dramatic than we expect. The long-run transformations are barely imaginable. OA

Johnson is an office automation industry consultant at SRI International's Office Automation Opportunities Multiclient Program, Menlo Park, Calif.

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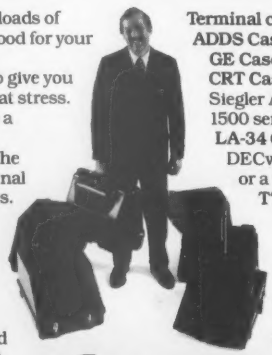

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WHAT DOES IT MEAN?

Ease Of Use

BY MICHAEL D. ZISMAN

Within the realms of office automation and personal computing, no issue is more important or less understood than the user interface (also known as human engineering, ergonomics and user-friendly). Like so many other areas of DP, designing the user interface is still more of a black art than a science. As a result, certain "laws of the good interface" have become widespread and accepted as sound design theory. When compared with actual experience, however, some of these laws seem highly questionable. Unfortunately, in the absence of sound theory, those that speak long enough and loud enough become the most credible.

It is time to challenge some of these basic notions about the user interface that have proliferated over the past several years and to consider some new ideas. The ideas I express here are the result of my past seven years in the OA field, consulting with major users and vendors, designing and implementing OA and transaction processing systems and

PHOTO BY LOU JONES

grappling to understand why people buy office systems and what they do with them.

After studying the issues related to user interface design, I have come to believe the challenges for software engineers are threefold. We must design interfaces:

- To manage multiple channels of communication.
- To support users with varying levels of expertise.
- To allow multiple concurrent tasks.

The remainder of this article addresses each of these three areas.

Users with Varying Levels of Expertise: Asked to specify the most important aspect of a user interface, most users and vendors quickly state "ease of use." Adherence to this principle not only misses the point, but also results in some very bad interfaces. Designers should not design systems that are easy to use, but rather systems that are easy to learn. An easy-to-learn system will be easy to use for both the new user and the experienced user.

Put more succinctly, it will have the very important attribute of scaling. Most interfaces that are easy to use (as opposed to easy to learn) are quite simple for the new user, but are time-consuming, irritating and frustrating for the experienced user. If an interface is to serve novices, experts and those in between, it must scale consistently to meet their different needs.

In this regard, designing office systems is quite different from designing traditional transaction processing systems. In a traditional transaction processing system, we generally assume the user will be trained for continual use and will quickly become an expert. The system is therefore designed for expert users.

In an office environment, such an assumption would be devastating, for at least two reasons:

First, an office system is (we hope) diverse in function; few users will ever become expert in all of the system's capabilities.

Second, many users, and often the more influential users, will always be casual users. They will develop expertise at different rates and on different applications. This very significant difference between traditional transaction processing applications (or purely production-oriented WP applications) and office systems has major implications for user interface design.

Although a totally menu-driven system is generally considered good user-interface design, it suffers from the problem described above. A pure menu system is easy for the novice, but often becomes a burden for the experienced user. The catch is that in a successful system, a novice quickly becomes experienced and that previously attractive attribute becomes a nemesis.

Although a totally menu-driven system is generally considered good user-interface design because it is easy for the novice, it often becomes a burden for the experienced user. In a successful system, however, a novice quickly becomes an experienced user and that attribute becomes a nemesis.

Should we conclude, then, that menu interfaces are undesirable? Certainly not. Without the simple menu interface, we might not have caught the user at all. The point is, however, that the type of interface most suitable for the new user is not suitable for the experienced user. A successful interface must be a dynamic one — adjusting to the user as needs, experience and concentration dictate. The implication for designers is that menu facilities must be augmented by other more efficient tools for the more experienced user.

A system recently designed and implemented at Integrated Technologies, Inc. demonstrates this point. The user interface consists of a typical menu-driven front end. Alternatively, however, the user always has access to a com-

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mand line and a language with which to enter a command to travel backwards or forwards across many menus. The command line is supported by a parser that handles spelling correction and word abbreviations.

With this capability, a user can either traverse through menus in the normal fashion or, in a fraction of that time, the experienced user can specify exactly what is to be accomplished.

This capability was introduced to a non-DP user population and actual usage was monitored. The results are really not surprising. For the common set of commands, users quickly (in days) migrated from using the menu structure to specifying single-letter or double-letter abbreviations for command strings. Although users migrated quickly from menus to highly abbreviated commands, the menu structure was a very necessary stepping stone and a facility that provided security and guidance for the new user. The lesson to be learned is that no single user interface exists that is best, but rather a continuum of interfaces is required so that scaling is provided.

Casual users make mistakes, and a capability to undo mistakes by undoing keystrokes can do more than any other single technique to encourage novice users to experiment.

Other techniques are also required to support users with varying levels of expertise. Function keys are valuable for both novices and experts. Traditional hard-coded (engraved) function keys work well with dedicated application systems as word processing, but soft function keys, which are labelled dynamically at the bottom or side of the CRT screen, are more appropriate for office systems that support a range of applications.

Casual users make mistakes, and a capability to undo mistakes by undoing keystrokes can do more than any other single technique to encourage novice users to experiment. For example, in most systems, when a user deletes a body of text it is irretrievably lost. With the undo key available on some newer office systems, a user can indicate that the last action or several actions should be undone.

Other techniques are also available to accommodate a diverse group of users. An obvious example is a help facility, which allows a user to request additional information at any point in an interaction.

Rich user profile capabilities can greatly assist the designer in building an interface that scales across a range of users. The user profile can contain information about the user's level of experience in various applications; the system can use this information to tailor the interaction more precisely to a user's requirements. Dialog managers can also be used to enhance the system's interaction with users.

For all the tools and techniques described above, a crucial parameter — consistency — must be maintained in serving users in an office environment. All applications and system functions must interact with the user in a consistent fashion and present the same appearance and "personality" to the user.

Multiple Channels of Communication: In the past few years, we have witnessed several attempts to augment the traditional keyboard/CRT workstation with other peripherals, such as pointing devices and voice response units. In each of these cases, we are simply attempting to increase bandwidth by adding additional channels of communication.

We normally use the term bandwidth in a very precise sense to define cycles per second or bits per second in a communication channel or processor. For our purposes, bandwidth refers more generally to the amount of information transmitted between a system and the user per unit of time.

"Control." *Reg Parker, Director, National Accounts Marketing, Electronic Office Systems Division*

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After studying successful user interfaces, I have concluded that the viability of a user interface is directly proportional to the bandwidth presented to the user. Most tools now used to augment the standard keyboard/display workstation are fundamentally bandwidth enhancers.

Graphics, digital tablets, mice and even function keys are all used with the goal of increasing the amount of information transmitted per unit of time.

One need consider only a few systems that are judged easy to use to appreciate the impact of bandwidth. Wang Laboratories, Inc. word processors achieved and have maintained a leading position in shared-resource word processing because they were considered very easy to use. Why? A primary reason is the highly menu-oriented nature of the Wang interface (at least to the new user).

However, many systems have such a menu interface — what makes Wang different? Bandwidth! Because Wang has a processor in each workstation and a high data rate link between the workstation and the disk controller, menus can be displayed almost instantaneously. A user will tolerate traveling through several levels of menus if the menus can be displayed at such a rate that they do not deter the user's progress. Imagine the same situation at 300 bit/sec.

Unfortunately, even today other vendors are building systems that need to be highly interactive (for example, word processing) and are attempting to do so by connecting a dumb terminal to a minicomputer across a low-speed communications line!

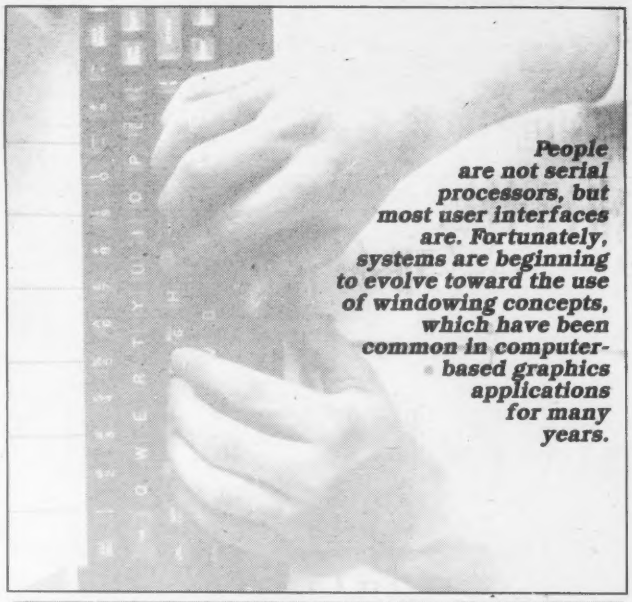
An even better example of a user interface that succeeds because of bandwidth is Visicalc. Visicalc converts a personal computer into a calculator — but a very fast, visual calculator with which a user can drive around a large spread sheet. Long before Visicalc was developed by Software Arts, interactive financial planning packages with a wider range of functional capabilities were available. Yet, none of these packages achieved a fraction of the spectacular success of Visicalc.

Why? Again, the answer is bandwidth.

Because Visicalc systems do not contain a constraining low-speed communications line, a design radically different from traditional systems is possible. The visual processing that makes Visicalc so popular and usable cannot be attained with the largest mainframe computer when that computer must deal with a dumb terminal through an RS-232 data link. The bandwidth simply is not there.

Without question, it is the bandwidth presented to the user that has made Visicalc a tremendous success. This bandwidth is achieved efficiently by eliminating the communications line that historically has constrained system-to-user communication.

In grade school, we learned a picture is worth a thousand words. Graphics becomes a key part of the user interface because it increases bandwidth — information presented per unit of time. As the cost of business graphics continues to decline because of graphics chip availability, graphics will become an essential component of the user interface.



People are not serial processors, but most user interfaces are. Fortunately, systems are beginning to evolve toward the use of windowing concepts, which have been common in computer-based graphics applications for many years.

Applications such as word processing will be recognized as computer-based graphics applications no different in fundamentals from graphics applications for circuit analysis: the primitives are letters, digits and so on and they must be displayed in a variety of sizes, styles and colors. Besides graphics, mice, touch panels and other pointing devices, function keys and voice input and output, other bandwidth enhancers will find roles in the user interface. Whenever we can add a new channel of communication, we can increase effective bandwidth and enhance the user interface.

Multiple Concurrent Tasks

Most individuals possess the impressive ability to perform a number of tasks at the same time. Human beings are excellent multiprocessors. Most computer systems, however, are highly serial in nature. To switch tasks (for example, from word processing to data base retrieval), the user must end one task, save some sort of environment and then start up another program. Most systems are organized around an operating system that invokes a program to run for a user at a terminal. That program performs a single task (for example word processing) and knows nothing of other capabilities.

If a user is in the midst of word processing and needs to look up information from a data base, the user must incur all the overhead of terminating the word processor, invoking the data base program, terminating the data base program and reinvoking the word processor, retrieving the original document and so on.

Worse yet, our poor user probably had to write down on a sheet of paper the results of the data base inquiry because as soon as the word processor is reinvoked, the results of the data base query are erased from the screen.

In summary, people are not serial processors, but most user interfaces are. Fortunately, systems are beginning to evolve toward the use of windowing concepts, which have been common in computer-based graphics applications for many years. With a windowing system, the CRT screen is dynamically divided into a number of rectangular areas, each called a window.

Each window has all the capabilities of a terminal, and a single terminal appears to the system to be many terminals. A user can edit a document with a word processor in one window, retrieve data from a data base in another and compose an electronic mail message in a third. By moving the cursor into a window, the user indicates which of several active processes he intends to use. Output from one window can be directed to another window, and different processes can be interconnected to carry out user functions.

By using a window approach, systems can support users in a far more natural way and provide an environment in which users can be far more productive than they can with traditional serial approaches.

Economics: The technology discussed above has been available for some time to virtually all vendors of office systems. Why, then, are vendors just now beginning to use pieces of these technologies in their product offerings? According to some people, vendors simply are not interested in good user interfaces. Based on several years of working with both vendors and users, I believe nothing could be farther from the truth. The simple fact is that, until very recently, users have not been willing to pay the premium necessary for the types of tools described here. A rich user interface requires substantial processor resources, memory, peripheral attachment and graphics capabilities.

Undoubtedly, there are many who reject this argument and hold the vendors responsible. There are many examples, however, to support it. This article has focused on the software aspects of the user interface, but consider the simple ergonomic issue of detachable sculptured keyboards. Most would agree that detached keyboards have a great impact on the ergonomics of a workstation and ultimately on user productivity and satisfaction. Yet, as users, we have repeatedly chosen word processors with nondetachable keyboards over detached units. Wang achieved market dominance in shared-resource word processors by providing a nondetached keyboard and has become a billion-dollar company in the process.

Now Wang is beginning to provide workstations with detached keyboards. Long ago, evidently, Wang management learned that what users say they want and what they want to pay for can be very different, indeed. Ultimately, users speak with their purchase orders.

As another example, consider Xerox Corp.'s Star professional workstation. The star has essentially all the capabilities described here and some beyond those. In terms of deliverable products, it clearly represents the state of the art from a user-interface standpoint. That's the good news. The bad news is that user acceptance of Star is very underwhelming. Users are not prepared for these capabilities, at least not as Xerox has priced them in the Star.

Fortunately, as costs decline, vendors can incorporate user-interface technologies without impacting price. In a sense, we will be rescued by the plummeting cost of technology, not by the user's willingness to pay more for good interface design. What is fundamentally new about office automation is that it is getting less and less expensive every day, and this will lead to better and better user interfaces. OA

Zisman is president and founder of Integrated Technologies, Inc., an office automation and MIS consulting service in Haverford, Pa.

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COMPARING PROFESSIONAL WORKSTATIONS

Hot Prospects

The ideal integrated personal workstation not only keeps a catalog of what the white-collar manager should remember during a normal routine, but also provides the capabilities to gather pertinent pieces of information, reorganize it to management's role and image and distribute the data in the most timely and neatly packaged way possible. In short, the management workstation should act as a natural extension of a manager's mind.

From a human productivity perspective, the argument is that managers and administrators have to become more efficient. The U.S. Department of Commerce stated that one-fourth of 51 million white-collar workers, grouped by earnings, were managers and administrators. However, the growth potential for the installation of management or executive workstations in the next five years was projected to be substantially lower than that for installation in the clerical area.

International Data Corp. (IDC), a leader in installed-base data file statistics, projected at their 1982 Briefing Session that, while 44% of the clerical force today has some kind of computer terminal, electronic typewriter or word processing device, by the year 1986, the ratio of these devices to clerical personnel would exceed 1:1. However, the same penetration projec-

BY WINSTON BRADFORD

tion will not be achieved in the management and professional area. The 1981 figure for the penetration of the management workstation into the professional area was a meager 3%, and by the year 1986, IDC estimated, less than 15%.

In order to understand the potpourri of functional differences loosely grouped under the title "professional," let us take a brief look at a sampling of the product descriptions on the market as of 1982.

Wang Laboratories, Inc. believed their Alliance 250 responded to the needs of the entire office and could be used easily by the complete hierarchy of office workers, from the staff professionals to the clerical support people.

Chairman Michael Blumenthal of Burroughs Corp. stated he thought it was not enough to make secretaries more efficient. He felt that the trend now should concern productivity of those who run the business; that was the objective of the Burroughs Information Office Systems — the Ofis 1.

In order to show that this was an office product, every software element of the Ofis 1 was prefixed with the word Ofis. The various components of Ofis 1 included the Ofiswriter text-editing machine, Ofisreader OCR system, Ofisterminal inquiry and display stations for interaction with central computers, Ofisfile and Ofisdirector.

Ofisfile acts as a file management system that allows for automatic filing and retrieval of documents on demand. Ofisfile can also locate background material by searching for words in the text.

Ofisdirector is intended to offer the phenomenon of true information management, where common resource-sharing and access to computer-stored data enable users to share working files, a central printer, Ofisfile and Ofisreader.

Ofisdirector has some added features that are supposed to add a management dessert. Software for Ofisdirector includes what Burroughs calls the "personal productivity tools" — calendars, schedules, an office dictionary, distribution lists, personal files and a letter/memo-writing capability. Ofisdirector's electronic mail allows Ofis 1 users to send messages or documents and to assign them priorities and security.

Data General Corp.'s announced approach went a bit further. DG's Comprehensive Electronic Office (CEO), designed to integrate OA and DP functions, is a system developed for the managerial executive for two outstanding purposes: The system would serve as a decision support system as well as a tool for integrating office tasks. A sideline would mean corporatewide access to information in the most timely fashion, coupled with an enhanced management control.

DG incorporated several different functions in its system, including electronic mail, electronic filing, administrative support facilities and software (such as a text-editing package and a decision support system) and a local-area networking capability called the Xodiac Network Bus.

DG felt that this was

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more a managerial and administrative tool than a clerical one for several reasons:

• The electronic mail on this system could be used to send messages, documents or graphics elements with the further communications capacity of doing all this remotely or locally. To make the product an electronic equivalent of the paper-based mailing system, the CEO system allows mail to be sent rapidly, returned, certified with an identifier or mailed confidentially: all the elements that a CEO would require.

• A personal calendar gives department heads an automated version of their desk calendar, while a resource calendar adds the availability of resources such as conference room availability and audio/visual access available for meetings. Telephone messages can also be received and mailed to the appropriate people.

• The rest of the system provides the equivalent of any complete file management system. An electronic filing function allows each user a private file cabinet with unlimited drawers, folders and documents, as well as a public cabinet open to authorized people.

• The classic "electronic wastebasket," the archiving method where deleted documents can be stored and later "uncrumpled" to be reused if necessary, is a further dimension, along with an "electronic superintendent," which empties the basket (or literally deletes files from the queue periodically).

• Along the lines of managerial jargon looms the newest software: the Decision Support Presentation Facility, which allows users to request information from a data base or a file based on multiple selection criteria. Present software output can incorporate graphics and text for on-line queries, report-writing, general-purpose data extraction and arithmetic computation.

Because humans like to organize their thoughts in groupings, Xerox believed the concept of icons was the right approach and provided a simple access method — a visual representation of a desktop.

Axxa Corp.'s Axxa System 90 goes beyond the narrower applicapabilities of a professional workstation and is described as an office communications facility for use by professionals, managers and clerical people. Working from the assumption that the user is of a nontechnical background, an English command language is implemented to operate the system, such as CUT, PASTE, FIND, MAIL, while commands that require input are solicited through on-screen questioning.

A variety of functions, such as simplified communications with other computer systems, off-site accessing, text-editing, electronic mail and filing and desktop computing are some of the other items that can be utilized on this system. The standard "help" key for further explanations, an "oops" key to correct errors and a user guide providing information on the system and more details on the command structure are available.

The electronic mail capability operates slightly differently regarding particularly confidential documents or materials that require a stringent distribution security. First, the system will stamp the time and date on the document, automatically look up the number of the receiver and dial it. If the document is not successfully sent, the system will automatically continue ringing the receiver, up to a total of six attempts.

If the message is still undelivered, the user will then be notified at his terminal by a flashing keyboard light. This light also signifies when this mail has arrived, when a phone message has been logged, when a document is placed in the in-box, when work has been interrupted, when the files are getting full and when the system needs more information to carry out a function.

Other capabilities of the system include such tasks as sorting, message logs, follow-up lists, calendars, the performing of calculations, the design of forms and the creation of form letters.

The system also has Basic computing capabilities, specific programs on investments, calculations, portfolio analysis, record processing or client billing — information that can be recast from computer outputs into reports and projects.

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Through a Telelink feature, two System 90 users can communicate with each other and their conversation saved on both sides. Data transfer can be accomplished at home, out of the office or in a remote location, with standard Ascii communications.

In spite of Axxa's broad range of management facilities, all the way to the Telelink remote capabilities for the office or home, Wang Laboratories, Inc. believed their Alliance 250 responded to the needs of the entire office and could be used easily by the complete hierarchy of office workers, from the staff professionals to the clerical support people. The integration of text, data, audio, imaging and networking are the key concepts of the Alliance 250.

Wang not only thinks of this system as giving a clerical advantage (making the secretary who shares two or more bosses a more efficient resource), but also feels it is valuable to the manager who is merely interested in technology.

The concept of a "window into the memory of the computer" or Wang's concept of "visual memory" (the Wang VS) allows the user to pull information from a data base in order to perform WP and DP tasks where the user can structure, categorize, access and manage groups of information. This program gives the operator an easy means to compile, arrange and output information.

The "document management" package transcends an electronic file cabinet; the document manager allows the user to retrieve any on-line or off-line document by specifying words located in text. Documents can also be searched by title, author, type of document operator, department, user-defined words or last data archived. This would be similar to other systems offered currently.

The "time management" package allows calendar management. The double purpose of this facility includes two system functions that allow either an administrative assistant to manage an executive's time or provides a manager with a way to organize his own schedule. A subset of this is a calendar management device that allows one to schedule meetings with one or more people, a "things-to-do" list, which acts as a tickler file to remind executives of upcoming events.

Xerox Corp., in the first quarter of 1981, announced a professional workstation designed to increase the professional's productivity by "reducing the professional's dependence on the service of others and avoiding the delay of waiting for those services."

The system (like the Alliance 250) is aimed at most professionals, including engineers, analysts, personnel and production specialists, editors, librarians, economists and administrators — those people who create, interpret and manage information and distribute the results to others in a convenient form.

Created with the knowledge worker in mind, the Star system helped professionals accomplish creative work more easily and, at the same time, significantly improved executive productivity in the process as a result of more and better information being available, according to Xerox.

On the Star system, Xerox used bit-mapping (useful for typesetting and graphics) with a resolution of 1/72 inch. It has the ability to display either one 11-in. by 14-in document or two 8½-in. by 11-in. documents side by side. Each display can be divided into three individual windows, which gives the Star the ability to view up to six different documents simultaneously and to scroll vertically and horizontally within any window.

Unfortunately, between the graphics display of document, folder and property sheet, a tendency exists for one to overlap the other, often allowing only partial display of the text. The ability to view six documents simultaneously on the screen is advantageous, but other vendors such as Vydec, Inc., Axxa Corp., Syntrex, Inc. and Atex, Inc. can do multiple windows as well.

Like the 860 word processor, Star's screen displays black characters on a white background. These are known as icons on the Star and are equivalent to the familiar physical object in an office. For example, a picture of a file drawer, file folder, floppy diskette or even an in-box are portrayed on the screen.

The physical placement or arrangement of the icons on the screen can also be determined and rearranged by the user at any given time. Because humans like to organize their thoughts in groupings, Xerox believed the concept of icons was the right approach and provided a simple access method — a visual representation of a desktop.

Besides the obvious statement that a picture is worth a thousand words, why does this "icon" make one more efficient? Or, maybe a better question, does one need a "mouse?" The mouse is a small device with ball bearings underneath, a thin wire attaching it to the terminal and two buttons residing on the top. Its main function is to move the cursor and select the icon displayed on the screen. The button on the left selects the icon indicated by the cursor, and the button on the right helps to select a larger portion of the item to which the cursor is pointing.

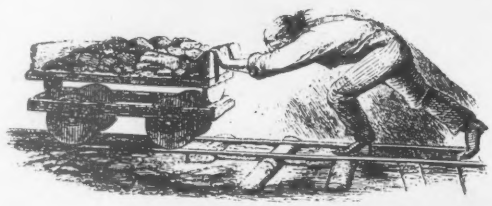
The cursor on the screen is controlled by the movement of the mouse (remember the ball bearings underneath) on a flat surface. The mouse should be sitting on a hard surface to have the movement affect the cursor. The size of the flat surface on which the mouse rests is a 2:1 ratio of the actual size of the screen. The movement of the ball bearings controls any movement of the cursor arrow. When the cursor is pointing to the icon or item on the screen, you then must initiate action by touching the mouse's select button.

The next step is to inform the system of the action you intend to take by touching the required function key. For example, if I wish to view all my documents in my "in-box," I must first position the cursor on the "icon," touch select (the left button), then touch the "open" function key. If I wish to view the documents in my "in-box" and then move them to a file folder, I can follow the steps above and then move the cursor to the file folder, select it and touch the "move" key.

Xerox believes the system is simpler for the nontechnical user because the display screen can be considered an electronic desktop equivalent, which shows easily recognizable office objects. These symbols, called icons, resemble documents, folders, file drawers and in-baskets.

Because the user can store, retrieve and process information, print a document, send electronic mail, draw a diagram or chart, change typefaces and sizes and have spelling checked by an electronic dictionary, Star is considered an all-purpose function machine, both from a documentation perspective as well as a simplistic way to organize the executive's time.

People — either professional or nonprofessional — tend to want the fastest control possible over their production; often that means having administrative control as well.



The kinds of products being used for executives and professionals differ in a variety of ways. The question of how one justifies the cost of these devices often arises. As technology pushes ahead and the National Computer Conference and Syntopican display the vendors' latest plans, certain buzzwords reappear.

The redefinition of local-area networks is constantly apparent — the benefits of the snake, ring or other kind of architecture. The importance of the capabilities of output devices is a concern — their quality and speed with the newer technology of the laser-based printers — as is the role of microprocessors in substantially bringing the price of all these systems down to the level of home consumption.

Consequently, the executive workstation is a result of several phenomena.

First and foremost, it was a realization on the part of some of the larger vendors of multiterminal shared-logic systems that the standard WP market share was becoming saturated, that software as well as hardware had to be enhanced in consideration of more applications-oriented buyers and that there was another whole job function within many applications — the role of the professional.

Second, with the evolution toward bit-mapped screens for business graphics and the prompted proliferation of personal computers, the desktop braved the scene. Both administrative functions, including scheduling programs and calendaring features, as well as a Digital Research, Inc. CP/M offering struck the newer angle or tier when approaching the decision maker for the office's future.

It is ironic that the management workstation is justified by an argument that because the professional is paid two to three times more than a clerical person, he would make it a point to ignore anything clerical. In fact, people — either professional or nonprofessional — tend to want the fastest control possible over their production; often that means having administrative control as well.

In conclusion, therefore, a deliberate analysis must be made of the resulting savings and the peripheral human costs of the management workstation. Part of this analysis must be the determination of the bottom line: to consolidate functions and responsibilities or to cut back on personnel. Most important, we should ascertain whether it will stifle or hinder altogether the creativity and spontaneous good judgment inherent in most successful executives. OA

Bradford is a market research analyst for one of the leading vendors in the computerized text processing field.

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Video Disks

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Fortunately for the latter, such a product is more science fiction than fact. However, there is an experimental device on the data processing horizon which will offer stiff competition to such traditional technologies as micrographics, magnetic tape and high-capacity magnetic disks. Theoretically, it will also have its biggest impact on office automation — particularly in applications requiring large data storage and fast information access.

The optical disk itself is not a new phenomenon. Currently, the most common and widespread use for the disk — which resembles a phonograph record in size and shape but is slightly larger, with a gold or silver, rainbowlike metallic finish — is for prerecorded movies. Consumers who buy prerecorded disks can play back the digitized sounds and images through an ordinary television by using one of a number of laser-based players presently on the market.

The entertainment industry justifiably favors optical disk recordings over videotape recordings. Unlike recordings on videotapes, when images have been "burnt," or, more accurately, punched onto the optical disks, they cannot be erased. The disk recordings also have to be created professionally and cannot be orchestrated at home, which allows the industry to control production and marketing — thereby protecting such things as copyright and residual fees.

The DP industry turned its head as well as its research and development money to optical disks when it learned

BY TIMOTHY J. SCANNELL

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the devices have a tremendous capacity for information storage. For example, a typical optical disk is said to have the capability to handle up to 50G bytes of data per surface, as compared with the 2.5G byte current total maximum offered by such present magnetic technology as IBM's 3380 disk system.

Another benefit of the optical disk is that a single device can store both words and pictures, which makes it particularly attractive to the graph- and image-hungry office executive who relys more often on pictures than words to present facts and ideas.

Two major drawbacks of the optical disk, however, are its information access speed and its one-time-use limitation. The fastest a user could ever hope to get data from an optical disk, at least according to present drawing board projections, is a little under 100 msec. IBM's 3380 magnetic disk system, on the other hand, can find, lift and present data to the user in about 16 msec. Also, since digital information is scored onto a disk by a laser, the data cannot be updated using the same disk. To update information, a user would have to create a whole new disk.

(The Japan Broadcasting Corp. recently developed a video disk that can be erased and re-recorded. Information is recorded on the disk — which is coated with a magnetic film — using a helium-neon laser. Rather than burning holes on the disk, the laser's heat causes reversals in the film's magnetic field much like a standard disk or tape drive alters the magnetic field on conventional recording media. To erase or re-record a disk, the device is bathed in a strong magnetic field, which flattens out the disk's magnetic field.

The erasable disk is, however, still very much in the prototype stage and will need further development to overcome inherent noise problems and coating imperfections.)

Because of these limitations, optical disks are expected to have a minimal impact on magnetic disks. However, because of their access speeds and durability, the recordlike devices are expected to put quite a dent in the magnetic tape and micrographics marketplaces. For this reason, although commercially available disk units are still at least two years away, users presently looking at magnetic tape-based or micrographics information storage systems may want to give the optical disk serious thought before committing to what some critics feel may be an outdated technology.

Despite the optical disk's handicap of having only one useful life, a number of corporations are currently considering its applications and storage capabilities. In fact, while magnetic disks and other reusable storage mediums are still heavily supported by most firms, a rising number are pushing erasability further down on the list of absolute requirements, according to Strategic, Inc., a research firm based in San Jose, Calif.

Strategic interviewed 30 different organizations for a report on the optical disk industry. The organizations reported a number of instances where a write-once/read-only medium would be preferable to the vulnerability of magnetic disk or tape.

Because of the declining cost of magnetic storage — which Strategic forecast will be on a pricing par with paper storage by 1990 — magnetic disks and tapes have little to fear from the encroachment of optical disks. However, micrographics will be given a run for the user's acquisitions money. Because of this shadow looming on the horizon, a number of firms involved in both micrographics and DP are seriously investigating the optical disk and its impact on the marketplace.

For instance, in late 1979, IBM and MCA, Inc. formed a joint venture — Discovision Associates — to develop, manufacture and market video disks and video disk players. IBM has not made it clear if it intends to develop video or optical disks for use in DP mass storage applications. However, in March of last year, Discovision did announce two products designed to link video disk players to computers via an RS-232C or IEEE 488 parallel interface.

Earlier this year, at the National Micrographics Association (NMA) show in St. Louis, 3M Co.'s Micrographics Products Division exhibited its interest in the optical disk by holding an "invitation-only" demonstration of the prototype of what is said to be the first functional and soon-to-be commercially available optical disk system. It was also shown quietly at this year's National Computer Conference in Houston.

The system, called the DF-2000 and manufactured by Toshiba of Japan, uses direct read-after-write (Draw) technology and includes a laser scanner and laser printer. It is expected to be available in the U.S. sometime this year or early next year at a cost somewhere between $45,000 and $60,000.

Publicly, 3M's interest in the Toshiba system and optical disks is generally from a marketing standpoint. It wants to capture a piece of the expected boom in optical disks, probably by distributing the Toshiba system or a system similar to it. However, behind closed doors, the firm's interest in optical disks stems from a belief that the technology could make micrographics obsolete in as little as 10 years, according to a 3M executive at the NMA show who asked to remain unidentified.

How much of an impact optical disks will have on the micrographics industry depends on who is doing the talking.

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cized consensus within the micrographics industry is that the optical disk will provide some impact, but will eventually live in harmony with film-based micrographics systems. It will have its place, most likely in applications that demand high usage and fast retrieval.

However, critics of this outlook — such as the forecasting gurus at Strategic, Inc. — say the optical disk will win out because it involves a less complicated process to record and retrieve information. Also, most executives do not want to use an often bulky microfilm or microfiche reader to pull information from a particular file.

Edward Westlund, manager of advanced systems research at 3M, said he believes the optical disk will impact micrographics in two areas: those applications that are in computer code, such as information prepared and presented by a computer; and a small portion of computer-output microfilm where the information does not have to be widely distributed and is confined within a single building, such as in an office environment.

"The optical disk will justify itself where the retrieval rate is very high and there is a network of terminals that lead into a central file," Westlund said.

He quickly tempered his remarks by stating that, although the optical disk is a viable technology in the office, it is not the answer for all office applications. "Remember, there are applications yet where good old paper is still the best way to go," he added.

It is in the battle against the high costs of paper and paper storage that micrographics scores its highest marks. For instance, the average office spends about $15,570 per year to maintain 10 standard five-drawer lateral file cabinets, according to a report prepared by 3M's Al E. Eggert, a marketing operations manager. This cost includes the cost of the cabinet, floor space, employees and paper. While an average-size micrographics filing system does require an initial outlay of a little less than $19,000, it costs $1,885 per month less to run than the 10-file paper-based system. As a result, it more than pays for itself in less than one year.

Micrographics is also a tried-and-true method of filing. In fact, an experienced operator can film and index about 2,000 documents an hour — a figure that would make any productivity-minded manager smile.

Westlund does not believe the emerging optical technology will slay micrographics — at least not with one quick swipe of its competitive sword. "They said that about the punched card," he observed. "Maybe they will die someday, but it's going to take a long, long time."

Although forecasters expect the first optical disk system to be announced within the next six months and delivered sometime in 1984, the technology still has a few bugs to be worked out before its grand unveiling. The major problem to be overcome right now is not with the hardware, but with the media. A single optical disk has the capacity to hold more than 180 feet of microfilm. However, while present-day optical disks are fine for visual presentations, their impurities and integral errors may make them unstable for high-density digital storage and repeated high-speed access.

"The media feeds a lot of research and development," Westlund pointed out. For the optical disk to be successful and competitive against the long-term storage benefits of micrographics, "it is necessary to have a media where 10 years from now, new errors will not be formed and existing errors will not intensify."

Drexler Technology Corp., 3M, Eastman Kodak Co. and Matsushita Electric Industrial Co. of Japan are among the companies presently devoting a lot of time, effort and money to developing a "clean" optical disk.

Larry Fujitani, a product manager for Optimem, a division of Xerox Corp.'s Shugart Associates subsidiary based in Palo Alto, Calif., agreed that the biggest problems in optical disks are with the media.

"Hardware is solved. There is no exotic technology used. The real key is taking that technology being used in other parts of the industry, that is not being put into a high-volume mode, and putting it into a high mode."

Like 3M's Westlund, Optimem's product manager theorized that the optical disk will have its biggest impact on time-dependent information storage in those applications where information must be kept highly available for 20 or 30 days and accessed on a continuing basis. For these types of situations, optical disk systems — which can store digitized pictures as well as words — will probably make micrographics obsolete. But, micrographics will outshine the optical disk in long-term and archival storage applications.

Micrographics also has a proven track record of image retention and archivability, Fujitani added. "We can make whatever claims we want to in the optical disk area on archivability, but it would be very difficult to prove it."

Despite its present drawbacks, including a recessionary economy that has slightly dried up some of the R&D money available to the technology, the optical disk is expected to be a formidable opponent to the micrographics industry. Unfortunately, these competitive expectations cause more frustrations and headaches for users than for vendors, particularly for those users trying to decide whether to buy a usually expensive micrographics system now or wait for all the hoopla surrounding optical disks to become fact.

For users caught up in such a wait-or-buy predicament, 3M's Westlund advised going for what is available now rather than betting on what still exists partly on blueprints.

"If they are postponing putting in a micrographics system that will save them money, in hopes of waiting for an alternative technology, they are throwing away their money."

Westlund observed that if a user presently needs some kind of an image storage system, yet wants to take advantage of whatever optical disk system is coming down the product pike, there are other possibilities besides putting off a purchase. For example, a user could buy a computer-based microfilm scanning system with remote terminals and a wideband network. If and when commercial optical disk systems do materialize, the user could substitute the optical disk drive for the micrographics system's film-based storage module. Up to 75% of the original equipment investment — in CRT terminals, printers and other peripherals — would remain intact, Westlund explained.

OA

Scannell is senior editor, systems, at Computerworld.

Despite its present drawbacks, the optical disk is expected to be a formidable opponent to the micrographics industry.

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The current economic situation and the rapidly developing office automation technologies are creating demands for increased staff productivity. For many organizations, the question of "if" technology can be used to enhance managerial and professional productivity has now given way to the question of "when" and "how" to approach the task. For those organizations, a major amount of internal selling is still required before management will buy any specific project concept. One organization that has taken on the "when and how" challenge of using technology to support professional staff is Manufacturers Hanover Trust Co. (MHT) of New York. The Corporate Cash Management (CCM) department of this $60 billion financial services organization has installed an Information Facility that allows ad hoc, direct, on-line information access by its nontechnical staff. Beyond that, its staff can define new files, load information

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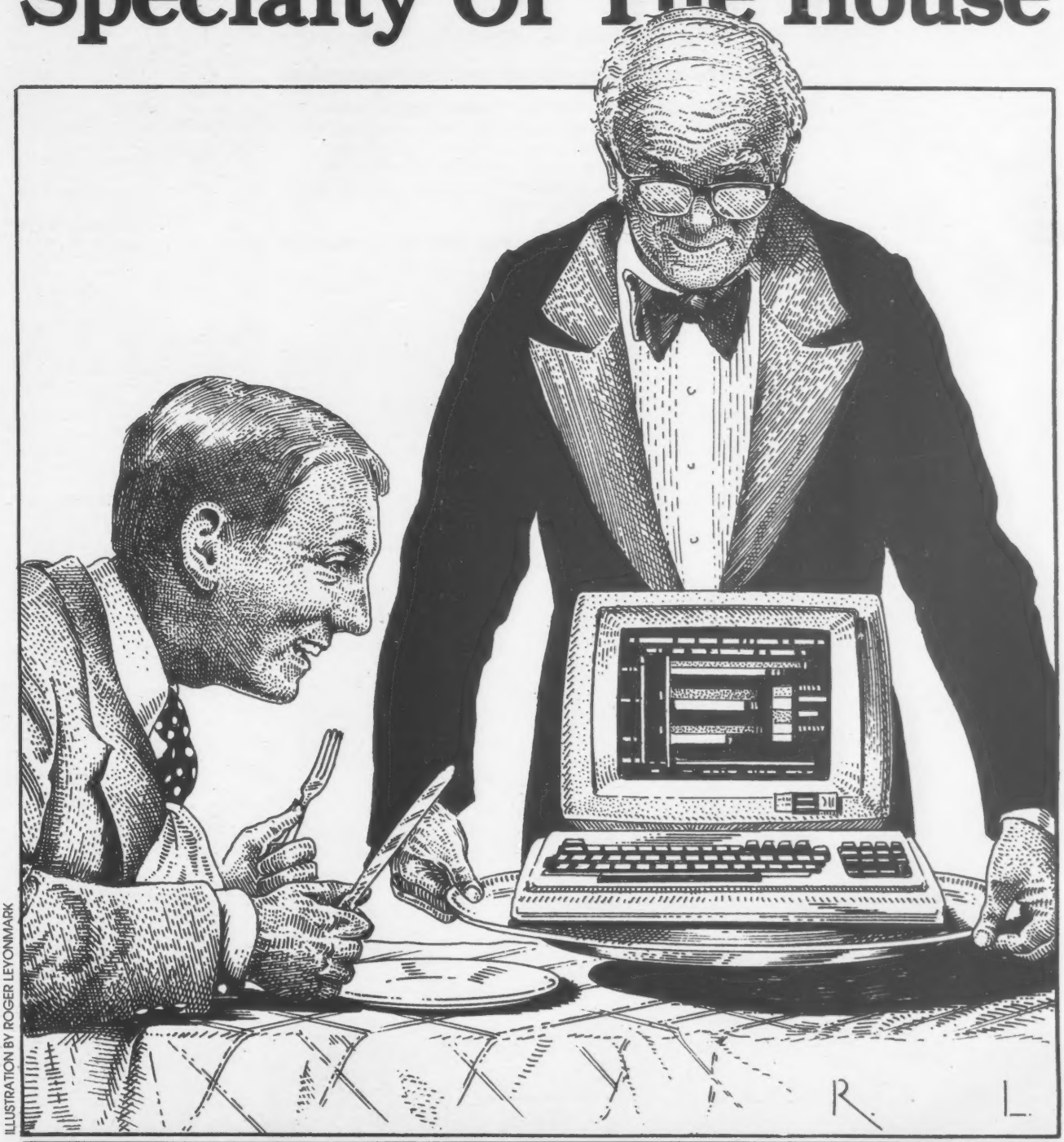

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In 1981, CCM was facing sharply increasing demands for products and sales coverage and concern was expressed about being able to manage and support the growth.

"We see the Information Facility as making a significant contribution to our current objective of increased productivity. Specifically, our immediate objective is to increase business with little increase in staff. The Information Facility will help us do that," said John R. Gleason, vice-president.

Substantial OA efforts at MHT had demonstrated to CCM management the successful use of technology by executives and professionals. CCM was one of the first departments to upgrade its word processing area and to pilot electronic mail, installing desktop terminals in managers' offices. They had also made use of the MHT Interactive Computing Facility, working closely with programming staff to quickly develop management reports on time-sharing computers. However, something more was needed to support the anticipated growth of CCM.

The office automation group was aware of the needs of CCM and arranged for that department's management to meet with an OA consultant. At that meeting, actual business examples of management use of information inquiry systems were discussed. This was a key discussion and persuaded CCM management that a solution to their problem could be found.

Because of the "futuristic" technology involved and the behavioral changes required, this kind of project is sold one step at a time. In fact, the selling of these concepts starts well before the proposal stage and continues long after the system is installed.

Because of the "futuristic" technology involved and the behavioral changes required, this kind of project is sold one step at a time. In fact, the selling of these concepts starts well before the proposal stage and continues long after the system is installed. This first meeting between CCM management, the OA group and the consultant was really a low-key marketing session of the information inquiry concepts. The project milestones discussed later in this article, in addition to marking technical progress, were also buying milestones marking user acceptance.

Work with a management consulting firm helped determine the alternatives available for rapidly improving information access, and an Information Facility project was designed. Only four months in the installation phase, the project was carried out under CCM supervision in a unique team atmosphere. The user (CCM) performed the general manager role, representatives from other MHT departments (such as office automation) served as in-house authorities and the consultant performed strategic consulting and most project tasks.

With the user in the management role, all the documents, benefits and decisions were written in the typical language of CCM, citing actual business problems and solutions. The consultant served as interpreter and, in some cases, liaison between CCM and the more technical departments and vendors.

During the initial stages of the project, a major task was to develop management's understanding of the alternatives available for solving the problem. Examples of other installations and frequent discussions helped. The next task was to convince management that these alternatives could actually be used in their specific case.

The project was carefully structured into three steps: a business case statement, the technology selection and implementation plan and the installation. All members of the project management team needed to approve each step, and frequent meetings took place.

The first major step, the business case statement, was a review of CCM's current situation with regard to need, application, desired usage, growth and volume of information. This investigation inventoried and organized the information sources, flows and uses within the department.

The business case statement also developed the goals, objectives and benefits of the proposed Information Facility:

- Improving quality of professional staff activity and decreasing the frustrations associated with less productive and less rewarding tasks.
- Enhancing the ability to perform more functional quantitative analysis.
- Achieving more effective planning, organization, control and communication of CCM operations by senior management.
- Aiding in the capture, access and monitoring of information on product activity, client activity, sales calls and so on.

An "information analysis diagram" was developed, in which each major group of information uses was organized into categories, which were then further broken down by major business functions. Examples, information subjects and type of content were also included. The objective was not to be complete in detail, but to cover the information needs from a top-down perspective.

The all-important technology selection was developed in three phases: a functional analysis, a system definition and the actual technology selection.

Specific business needs were defined in the function analysis. The system definition converted these needs into a list of processing capabilities and features. This important step resulted in a specification of technical capabilities that user management could understand, switching from a business view of CCM to a procedural

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view of input, output and processing.

The system definition called for three different methods of information capture (or input): text from word processing, data from automated files and direct terminal entry from individual CCM personnel.

Retrieval capabilities were described as:

- Ease of use directly by any CCM staff with minimal training.
- Integrated access to text and data.
- Access to different files for integrated retrieval and reports.
- Remote access for personnel while away from the office.
- Easy file expansion and file definition changes.

Underlying the system requirements was the need to minimize development time and expense. Technology selection therefore focused on off-the-shelf products.

Data-based systems were the prime candidates because of the heavy emphasis on data storage and retrieval. Although no systems available at the time met all the requirements in an off-the-shelf sense, the selection was narrowed to two systems that could handle both text and data. Infodata Systems, Inc.'s Inquire was chosen because, at the time, it had strong available data structures, better report writer features and could be made easier to use.

Hardware needs in terminals and computer processing were also analyzed and recommended with the technology selection.

The final implementation plan included not only the sequence of installation steps, but also cost estimates and delegation of responsibility of the various tasks.

At this point, the project needed management's approval for implementation. There were some serious concerns as to whether the system would actually perform as advertised, since it seemed too good to be true.

To resolve this situation, a unique demonstration was devised. Using a service bureau, mock data was hand keyed in the system and several interface queries were designed. CCM personnel were trained. Within one month, CCM personnel (not a vendor or the consultant) gave a live demonstration of pertinent data to MHT management. A decision to proceed was the result.

The implementation phase took four months. The decision was made to continue to use the service bureau in the interests of time and cost. Three application files were designed and loaded, containing such information as call reports, customer profiles and product information. One interesting and important step was the development of a direct interface between the CCM word processors and the data base system.

The key to the effectiveness of the system was handling of the data base system queries. These queries are constructed based on Boolean algebra, which is true for all data base systems. A menu facility "front end" written in the language of CCM was developed. Repetitive format and data content were defined so that the information facility became easy and fast for CCM personnel to use. The menu also included messages of explanation on what information was available and how to use the system. There was no need for a manual with this mode of usage.

CCM personnel are able to use the system, define and load information in files, train others and develop queries for inclusion in the menu structure.

Users were trained starting in April. The Information Facility has replaced manual analysis that used to take man-weeks of effort. In one display, a user can access information that previously resided in such different locations as file drawers, word processing diskettes and computer files.

"We need both text and numbers. We need the information selectively and without a lot of notice. The Information Facility is unique in its ability to satisfy these requirements. It is flexible enough to satisfy the varied information demands of product managers, the marketing group and the service unit," Vice-president Richard J. Fagin noted.

Plans for the future include loading more of CCM's files, interfacing with the corporate electronic mail system and with local microprocessors.

The success of the project is largely due to the process of beginning with a solid business case stated in user terminology and then proceeding toward a technical solution that, first, meets the user's concept of needs and, second, could be installed in a workable timeframe and with a successful team approach. OA

Hannagan is president of Hannagan & Associates, Inc., a management consulting firm specializing in office automation, with offices in Chicago and New York.

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TECHNOLOGY

A modularly designed microcomputer system that features a detachable CRT monitor, a 270K-byte flexible disk drive and up to 512K bytes of random-access memory was unveiled by **Hewlett-Packard Co.**

The HP 86 is similar to the firm's HP 85 except that it includes a detachable CRT screen and more professionally oriented software. It costs $1,795 for a basic system consisting of a microprocessor, keyboard and four ports, which can accommodate HP's Model 82900 plug-in Digital Research, Inc. CP/M operating system, a modem, extra memory modules and additional read-only memory. A complete system costs less than $3,900.

A portable computer, the HP-75, was also unveiled, measuring 10 in. by 5 in. by 1¼-in. It plugs into a full range of peripherals. The unit costs $995. HP also introduced the HP 3000 Business Graphics Software package priced at $10,750. More information is available from local HP sales offices.

Sperry Univac is offering software that reportedly enables its System 80 to perform both DP and WP applications on a single system. The menu-driven software will be available in January, with a monthly license fee of $105 or a one-time license of $5,040. Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Syntrex, Inc. has introduced a local-area network system, Sunnet, that interconnects multiple Gemini Always-Up electronic filing cabinets and Polaris cluster systems. Sunnet links up to eight clustered systems through baseband transmission and costs $6,500 for each Polaris and $4,500 for each Gemini system attached.

Syntrex has also introduced a text editor for the Aquarius WP system. The memory increase costs $600; Aquarius costs $7,990, the firm said from 246 Industrial Way W., Eatontown, N.J. 07724.

ECS Telecommunications, Inc. is extending the capabilities of its Voice Message Exchange (VMX) with the introduction of its voice mailbox. The digital store-and-forward system enables users to communicate nonsimultaneously via telephone.

A VMX 16, which handles up to 1,000 users, costs $195,000; the VMX 64, which handles up to 3,000 users, costs $525,000. There is a $2,000 charge for installation of voice mailboxes, ECS said from 1241 Columbia Drive, Richardson, Texas 75081.

Cado Systems Corp. has unveiled an entry-level word processor said to incorporate a full range of document-oriented text handling and formatting features, including column manipulation, file creation and horizontal scrolling. The desktop Cado Cat Writer costs $5,490, Cado said from 2771 Toledo St., Torrance, Calif. 90503.

Applied Data Research, Inc. (ADR) is offering a mainframe-based electronic mail system that is integrated with the vendor's on-line WP system, ADR/ETC.

The permanent license fee starts at $36,000 for IBM OS/VS environments and $28,000 for DOS/VSE environments, the vendor said from Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

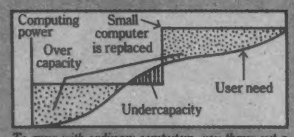
Altos Computer Systems, Inc. is offering Ethernet computer networking capability for its 16-bit microcomputers and an Altos-to-Altos high-speed networking scheme called Altos-Net. Altos' Ethernet costs $2,500/CPU and Altos-Net networking costs $295/CPU. Easy upgrades are available, the firm said from 2630 Bering Drive, San Jose, Calif. 95131.

Commterm, Inc. has unveiled a digital voice store-and-forward system said to let users automatically and remotely control the access, location and disposition of their telephone messages. An

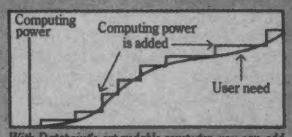
"I don't think any other computer could have grown with us the way our Datapoint has."

—Riley Jackson
VP., Information Systems
First Interstate Bank of Washington,
Seattle

First Interstate Bank's computer was the right size when they bought it, and *stayed* the right size as the company's data processing needs grew. That's because they bought Datapoint's *expandable* computer system, the ARC™ local network.



To grow with ordinary computers, you throw out a little one and bring in a bigger one. You almost always have too much computer or too little.



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installed Electronic Voice Exchange system designed to handle 1,500 users costs about $130,000, Commterm said from 10 Third Ave., Burlington, Mass. 01803.

IBM has unveiled videotex software that links its Personal Computer with Series/1 processors and provides text and graphics information over standard phone lines.

SVS/1 can be used to transmit internal mail or other information through up to 24 concurrent videotex callers. SVS/1 will be available this December for a one-time license fee of $10,000, IBM said.

NCR Corp. has introduced a new model of its Worksaver WP system. Prices range from $9,895 to $25,000 for a four-station configuration. NCR said from Dayton, Ohio.

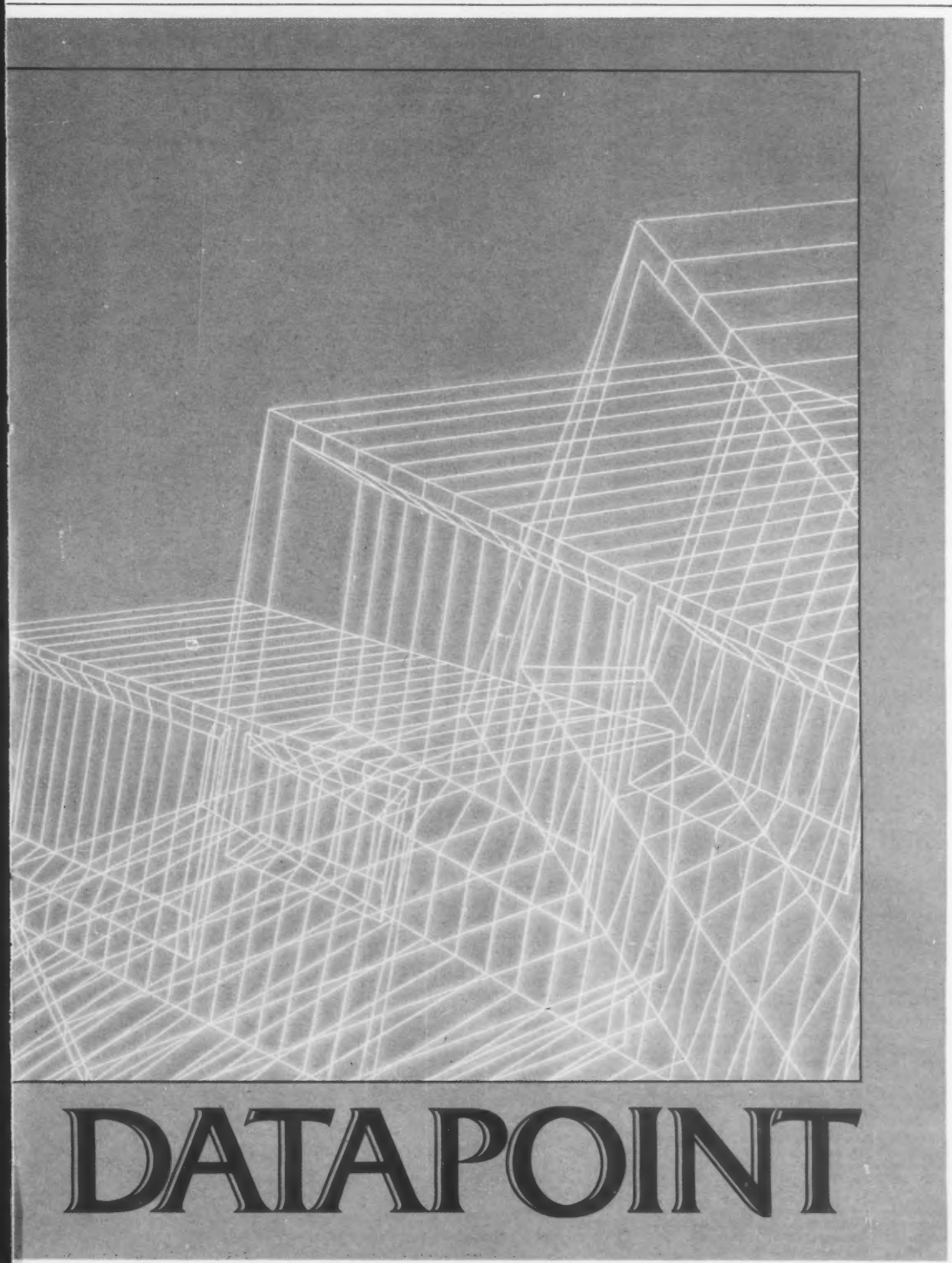
BBN Computer Corp. announced four information management capabilities for its C Machine family.

The packages include the Infomail electronic mail system, the Ezcalc spreadsheet modeling program, the NPP text-formatting preprocessor and an enhanced release of Pen full-screen editor.

Prices are $20,000 for Infomail, $500 for Ezcalc and $1,500 for Pen; Pen is bundled at no extra charge, BBN said from 33 Moulton St., Cambridge, Mass. 02238.

CPT Corp. unveiled its 8500 series of word processors, which feature a full-page black-on-white CRT screen, console tilt and movable keyboard. Prices for the four available systems run from $6,900 to $10,990.

CPT also introduced a local-area network, the Office Dialog Link, which interconnects office products through a central data switch, CPT said from 8100 Mitchell Road, P.O. Box 295, Minneapolis, Minn. 55440.



Xerox Corp. introduced its enhanced version of its 820, the 820-11 personal computer, which has a Zilog, Inc. Z80A microprocessor instead of a Z80, an enhanced performance Digital Research, Inc. CP/M, a 10M-byte disk and a bus access slot for future system expansion. Upgrades from the 820 cost $400. It costs $7,695 with a 10M-byte mini Winchester disk and 8-in. floppy. Xerox is at 1341 W. Mockingbird Lane, Dallas, Texas 75247.

New from **Honeywell, Inc.** is Infocalc, a menu-driven electronic work sheet with advanced windowing and paging capabilities.

The software reportedly runs on the firm's entire line of office automation systems, which includes integrated and administrative systems and the single-station Infowriter system. Infocalc costs $80 on the Infowriter and $120 on dedicated, multiuser administrative systems and the multifunction integrated system. Honeywell is at 200 Smith St., Waltham, Mass.

Wang Laboratories, Inc. introduced Alliance software on the Wang VS 45, 90 and 100 models.

The base-level Alliance package on the VS comes with a variety of information processing capabilities, including word processing, system security and a spelling verifier, the vendor said. The basic package costs $10,000.

Wang also announced OIS and VS software enhancements for additional integrated functionality to both DP and WP environments. Wang is located at 1 Industrial Ave., Lowell, Mass. 01851.

Compucorp unveiled the Simplifier and added a top-of-the-line Model 686 that can have 15M or 45M bytes of Winchester disk. Designed for text editing, the Simplifier is available in two versions for $4,995, the vendor said. Word processing and Digital Research, Inc.'s CP/M can be added. The Model 686 reportedly can operate as a stand-alone word processor/data processor or as part of Omeganet, the firm's local-area network. The Model 686 costs $15,995 Compucorp said from 2211 Michigan Ave., Santa Monica, Calif. 90404.

CALENDAR

Oct. 4-6, Washington, D.C. — **Local Area Computer Networks.** Contact: The George Washington University, School of Engineering and Applied Sciences, Washington, D.C. 20052.

Oct. 6-8, Danvers, Mass. — **Automated Office of Tomorrow.** Contact: The Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 6-8, Danvers, Mass. — **Video Disk Software.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 7-8, St. Louis — **ACM Conference on Security, Audit and Control in Office Systems.** Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 11-12, Orlando, Fla. — **How to Plan, Implement and Manage a Word Processing System.** Contact: Battelle, 4000 N.E. 41 St., P.O. Box C-5395, Seattle, Wash. 98105.

Oct. 11-13, Los Angeles — **Second Annual Teleconferencing Users Conference.** Contact: Satellite Communications Services, Suite 209, 5 Crow Canyon Court, San Ramon, Calif. 94583.

Oct. 11-14, New York — **Information Management Exposition & Conference.** Contact: Info 82, Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10167.

Oct. 13, New York — **Data Communications.** Contact: Women in Data Processing, Inc., Suite 2008, 210 Madison Ave., New York, N.Y. 10017.

Oct. 14-15, Toronto — **Understanding and Using Computer Business Graphics.** Contact: Carol Sapchin, Account Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Oct. 18-20, Washington, D.C. — **Using Small Computers: Implementing Integrated Information Systems.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Oct. 19-22, Los Angeles — **Planning for Office Systems.** Contact: IBM, Third Floor, 3550 Wilshire Blvd., Los Angeles, Calif. 90010.

Oct. 20-22, Washington, D.C. — **Selecting Small Computers for Government and Business.** Contact: The George Washington University, School of Engineering and Applied Sciences, Washington, D.C. 20052.

Oct. 21, Arlington, Texas — **Human Factors in Office Automation.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Oct. 25-27, Boston — **"X.25 and Other Protocols."** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 25-29, New York — **James Martin 5-Day Fourth-Generation Methodologies Seminar.** Also Nov. 8-12, Toronto. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 26-28, San Jose, Calif. — **The Word Processing & Office Technology Exposition & Conference.** Contact: Word Processing & Office Technology Exposition, Management Office, Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086.

Oct. 26-28, New York — **Leonard Kleinrock on "Computer Networks."** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 27-29, Washington, D.C. — **Federal Office Automation Conference.** Contact: Federal Office Automation Conference, P.O. Box E, Wayland, Mass. 01778.

Oct. 28-29, Boston — **Office Work & New Technology.** Contact: International Conference, Working Women Education Fund, Third Floor, 1224 Huron Road, Cleveland, Ohio 44115.

Nov. 1-2, New York — **Evaluating Decision Support Software: A Managerial Perspective.** Contact: DSS Conference, 215 First St., Cambridge, Mass. 02142.

Nov. 2-5, Washington, D.C. — **Planning for Office System.** Contact: IBM, Information Systems Management Institute, Third Floor, 3550 Wilshire Blvd., Los Angeles, Calif. 90010.

Nov. 8-10, Santa Clara, Calif. — **"Local Data Networks."** Contact: The Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Nov. 14-16, Danvers, Mass. — **Automated Office of Tomorrow.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Nov. 30-Dec. 2, Ann Arbor, Mich. — **Office Automation: The Facility Management Perspective.** Contact: Facility Management Institute, 3971 S. Research Park Drive, Ann Arbor, Mich. 48104.

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